JPRS 75332

19 March 1980

USSR Report

ENERGY

No. 2

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

Soviet books and journal articles displaying a copyright notice are reproduced and sold by NTIS with permission of the copyright agency of the Soviet Union. Permission for further reproduction must be obtained from copyright owner.

JPRS 75332

19 March 1980

USSR REPORT

ENERGY

No. 2

CONTENTS

PAGE

ELECTRIC POWER

Technical-Economic Analysis of Purifying GRES Water of Petroleum
(F. G. Gusar; ELEKTRICHESKIYE STANTSII, No 6, 1979).. 1

Energy Sources, Facilities in Kazakhstan Discussed
(T. Baturov; KAZAKHSTANKAYA PRAVDA, 22 Dec 79) 7

First Power Unit at Moscow TETs-25 Started Operating
(S. Borisov; STROITEL'NAYA GAZETA, 23 Jan 80) 11

Progress on Atommash Reported
(A. Zornin; TRUD, 24 Jan 80) 12

Geothermal Energy Possibilities in Dagestan Discussed
(D. Akhmedkhanov, A. Podol'skiy Interview; SOVETSKAYA ROSSIYA, 16 Nov 79) 13

Seventieth Birthday of A.M. Nekrasov
(ELEKTRICHESKIYE STANTSII, No 2, 1979) 17

ENERGY CONSERVATION

Efficient Handling of Fuels, Lubricants Discussed
(T. Nikitina; VOZDUSHNYY TRANSPORT, 17 Jan 80) 20

More Efficient Petroleum Refining Discussed
(N. Valitov; SOTSIALISTICHESKAYA INDUSTRIYA, 28 Dec 79) 22

FUELS

Latvian Peat Industry Report
(G. Ozols; SOVETSKAYA LATVIYA, 23 Jan 80) 25

CONTENTS (Continued) Page

Oil Prospects for Siberian Platform Areas Weighed
(A. A. Bakirov, et al.; NEFTEGAZOVAYA GEOLOGIYA I GEOFIZIKA, Nov 79) 29

Wide Band Acoustic Well Logging Tested at Samotlor
(B. M. Bikbulatov, et al.; NEFTEGAZOVAYA GEOLOGIYA I GEOFIZIKA, Nov 79) 40

New Steam Generator Ready for Use in Komi ASSR
(K. Mosiyenko; TRUD, 30 Jan 80) 46

Ventilation of Donbass Mines
(K. K. Busygin; UGOL', Nov 79) 48

New ERP-2500 Rotary Excavator
(SOTSIALISTICHESKAYA INDUSTRIYA, 11 Jan 80) 52

Official Replies to Letter of Criticism
(P. Marosin; RABOCHAYA GAZETA, 29 Jan 80) 53

Briefs
- Petroleum Pipeline System 54
- Fire Fighting 54
- Liquid Paraffin Plant 54
- New Petroleum Gusher 55
- Synthetic Diamonds 55
- Water Against Methane 55
- Coal Over Pipes 56
- New Appointment 56
- Concentrator Plant in Operation 56

ELECTRIC POWER

UDC 621.311.22:628.314.2:005.001.86

TECHNICAL-ECONOMIC ANALYSIS OF PURIFYING GRES WATER OF PETROLEUM

Moscow ELEKTRICHESKIYE STANTSII in Russian No 6, 1979 pp 9-10

[Article by F. G. Gusar, engineer (Yuzhtekhenergo): "Technical Economic Analysis of Purifying GRES Drainage Water of Petroleum Products"]

[Text] The Yuzhtekhenergo enterprise completed a technical-economic analysis at thermal electric power plants designed according to the following arrangements: settling-pressure flotation (Litovskaya GRES); settling-pressure flotation-filtration by anthracite filters and activated carbon filters (Iriklinskaya GRES); and settling-filtration by anthracite filters -- two stage sequential filtration by activated carbon filters (Konakovskaya GRES). To gather the necessary data for such an analysis, investigations were made at the three indicated TES in the process of which, along with the determination of the efficiency of purification of the drainage waters, information was also gathered on the cost of the installations as a whole and of their individual technological units, deductions for amortization, service personnel wages, cost of heat, electric power, compressed air, etc. This made it possible to determine, besides the efficiency, the total capital expenditures also to build the installations, their annual operating expenses and the production cost of purifying a cubic meter of drainage. All these averaged results and the information and calculations made on their basis are shown in Tables 1-3.

Table 1.

Technological unit of the installation	Litovskaya GRES			Iriklinskaya GRES			Konakovskaya GRES		
	Petroleum content mg/l	Efficiency of purification, %		Petroleum content mg/l	Efficiency of purification, %		Petroleum content mg/l	Efficiency of purification, %	
		unit	cumulative total		unit	cumulative total		unit	cumulative total
Ahead of petroleum traps	21.0	-	-	15.0	-	-	29.9	-	-
Ahead of flotation unit	9.0	57.0	57.0	8.1	46.0	46.0	-	-	-
Ahead of mechanical filters	4.9	45.6	78.7	4.13	47.7	72.5	14.30	52.1	52.1
Ahead of filters of activated carbon Stage I	-	-	-	2.10	49.2	86.4	2.8	25.0	90.6
Beyond filters of activated carbon Stage I	-	-	-	1.2	43.0	92.0	2.1	25.0	92.9
Beyond filters of activated carbon Stage II	-	-	-	-	-	-	1.8	14.3	94.3

Table 2.

Expense item	Litovskaya GRES		Iriklinskaya GRES		Konakovskaya GRES	
	Operation expenses rub/yr	Share of total, %	Operation expenses rub/yr	Share of total, %	Operation expenses rub/yr	Share of total, %
Amortization	20,417	36	52,721	30	41,623	17
Heat	-	-	31,272	18	125,092	51
Electricity	14,531	26	29,473	17	14,496	5
Compressed Air	-	-	2,146	1	1.071	0.5
Cost of periodic replacement of activated coal and crushed anthracite	-	-	16,000	9	183,000	7.5
Wages	7,225	12	7,378	6	14,755	6
Current repairs	4,083	7	10,544	6	8,325	3.5
Other expenses	9,517	19	21,192	15	19,410	10
Total	55,773	100	170,727	100	243,072	100

Table 3.

Technological arrangement of purification	Reduced expenses (for E_H-0.12), [illegible]b/year	Production cost of purification kopeck/m^3
Settling-pressure flotation (Litovskaya GRES)	119,857	4.25
Settling-pressure flotation-filtration by anthracite filters and activated carbon filters (Iriklinskaya GRES)	311,170	13.00
Settling-filtration by anthracite filters - two stage sequential filtration by activated carbon filters (Konakovskaya GRES)	355,266	18.5

The purifying installations investigated have the following special features of technological arrangements and equipment.

The installation for purifying drainage waters at the Litovskaya GRES consists of pumping the oil-contaminated drainage to the purifying installation and repumping the drainage after purification to a pond; two intermediate reservoirs with capacities of $700m^3$ each; two typical petroleum traps with a productivity of $400m^3$/hour; two radial flotation units with a productivity of 300 to $400m^3$/hour each; a $576m^2$ ($2130m^3$) production building; reservoirs for purified water, trapped fuel oil and residue; as well as a $2700m^3$ residue accumulator. The flotation purification of drainage waters at the Litovskaya GRES is done in an arrangement with the recirculation of 40% of the flow being purified. The productivity of the purifying installation at the Litovskaya GRES during the investigations was 240 to $320m^3$/hour. The total cost of the installation was 534,034 rubles.

Drainage waters of the Iriklinskaya GRES are purified at an installation differing from the one described by the following. Bell flotation units are used here instead of radial ones, while the flotation purification of the drainage waters is done in an arrangement without recirculation. Moreover, the water at this TES, after the petroleum traps and flotation units, is sent for further purification to antracite filters and activated carbon filters. A building with an area of $1470 m^2$ ($11,050 m^3$) was built for the filters and the equipment of the flotation installation. The productivity of the purifying installations of the Iriklinskaya GRES during the investigations was $150 m^3$/hour on the average and their total cost was 1,170,359 rubles.

The Konakovskaya GRES installation differs from the others as follows: Drainage waters to the intermediate reservoirs are sent over a fairly branched underground network by automatic pumping stations located at a considerable distance from each other. This leads to the total cost of the purifying installations here being almost twice as much (2,141,037 rubles) as that of the Iriklinskaya GRES, although the technological parts of both installations are of the same design. Moreover, the flotation installation was not put in operation at the Konakovskaya GRES; therefore, to make the two versions comparable, the total cost of the purifying installations of the Konakovskaya GRES was replaced by the similar cost of the Iriklinskaya GRES but deducting the cost of equipment and buildings for the flotation installation. Thus, it amounted to 934,954 rubles. The productivity of the purifying installations of the Konakovskaya GRES during the investigations was, on the average, $150 m^3$/hour.

The rated productivity of the installations at all the indicated TES was the same and equal to $400 m^3$/hour each.

An analysis of the data in Table 1 indicated that the best purified water was produced at the Iriklinskiya GRES. This can be explained by two things: first, at this TES, due to the high standard of operation of the heat power equipment, the drainage waters are less contaminated with petroleum products than at the other two TES; secondly, the pressure flotation installation at the Iriklinskaya GRES reduces the oil and fuel oil loads on the anthracite and activated carbon filters considerably.

The total degree of purification of drainage waters at the Konakovskaya GRES is fairly high (94.3%), but the water coming out of the purifying installations contains more petroleum products compared to the Iriklinskaya GRES. This is due basically to the fact that the flotation installation was not put in operation at the Konakovskaya GRES, so that about 50% of the petroleum contaminated water here is sent directly to the filters. As a result, filtering materials are very rapidly saturated with the petroleum products and operate at a reduced efficiency.

The lowest degree of purification (78.7%) was obtained at the Litovskaya GRES, which is due to the absence of a filtration installation in the purification arrangement.

When the total costs and data of Tables 2 and 3 are compared, it may be seen that installations designed in the arrangement settling-flotation-two stage filtration installation with anthracite and activated carbon filters increase the total capital expenses by 2.2 times. Opeating expenses increase in this case by over three times.

Installations made in the arrangement settling-filtration by anthracite filters-two stage sequential filtration by activated carbon filtration (arrangement without flotation), are only 20% less expensive when designed in a full arrangement with flotation. The operational costs of purifying installations are 1.4 times greater than similar costs for installations that have flotation.

A comparison of both versions with reduced costs (Table 3) indicates that purifying installations with settling, flotation and filtration (Iriklinskaya GRES) are more economical than installations with settling and filtration only (Konakovskaya GRES). The saving in this case is 44,040 rubles/year.

Conclusions

1. Technological arrangements of installations for purifying drainage waters at TES of petroleum products should, as a rule, use pressure flotation that makes it possible to reduce significantly the production cost and increase the efficiency of purification compared to arrangement without flotation.

2. The additional purification of drainage waters of petroleum products by filtration requires high operating and capital expenditures; therefore, it is very urgent at the present time to increase the intensity of drainage purification in mechanical and activated carbon filters, as well as to develop highly efficient processes for the regeneration of the drainage waters.

COPYRIGHT: Izdatel'stvo "Energiya","Elektricheskoye stantsii", 1979

2291
CSO: 1822

ENERGY SOURCES, FACILITIES IN KAZAKHSTAN DISCUSSED

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 22 Dec 79 p 3

[Article by T. Baturov, Minister of Power and Electrification of Kazakh SSR]

[Text] The workers of our industry are completing the fourth year of the Tenth Five-Year Plan in the atmosphere of great political and labor enthusiasm created by the resolutions of November (1979) Plenium of the CPSU Central Committee. The speech of Comrade L. I. Brezhnev, Secretary General of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet, at the Plenium was perceived by the power industry workers as a program of urgent tasks.

On the eve of Power Engineers' Day, their professional holiday, they are attentively studying the resolution of the CPSU Central Committee "On the 110th Birthday of Vladimir Il'ich Lenin". This party's document which is filled with historical optimism makes the workers proud, makes them evaluate critically what has been achieved, and fulfill the plans of the five-year plan. It should be mentioned that the workers of our industry have a very good basis to achieve this goal.

This year, the output of electricity in the republic will exceed 60 million kilowatt-hours. The labor productivity in the industry in eleven months amounted to 101.4% of the planned level, and our products sold 11.5 million rubles above the plan. Fuel economy is given much importance at electric power stations. During the years of the five-year plan, it increased by more than a million tons in comparison with 1975. In 1979, the best results in this respect were achieved by the workers of the Ust'-Kamenogorskaya and Karagandinskaya TETs.

In the republic, powerful territorial production complexes are developing, very rich natural resources are being involved, and the most advanced branches of industrial production are gaining strength. All this tremendous national economic mechanism must be reliably provided with electric power.

The main directions in the development and increasing of the technical level and effectiveness of electric power production in the republic are the construction of very large thermal stations on the basis of inexpensive Ekibastuz coal, the reconstruction and modernization of the existing equipment, and overall mechanization of labor-consuming jobs.

In Kazakhstan, modern block-type stations have been built: Yermakovskaya and Dzhambulskaya GRES. In almost all oblast centers and large industrial cities heat and electric power stations are operating, producing electric and thermal energy with minimal specific fuel consumption. New heat and electric power stations in Karaganda and Tselinograd with turbine units of 110 and 80 megawatts started operating. The expansion of the existing stations is continuing: Pavlodarskaya TETs-3, Kzyl-Ordinskaya and Gur'yevskaya TETs. Alma-Atinskaya TETs-2, Ekibastuzskaya GRES-1, and Shul'binskaya GES are under construction, and preparations have started for the construstion of the second Ekibastuzskaya and Yuzhno-Kazakhstanskaya GRES.

Since the beginning of the five-year plan, about 1.2 million kilowatts of new capacities have been put into operation at electric power stations of Kazakhstan. In the current year, a considerable volume of construction, installation and reconstruction jobs have been completed at the Alma-Ata TETs-1, which ensured the reliability of heat supply.

Construction of electric power networks is conducted widely. Since the beginning of the five-year plan, 69,000 kilometers of electric power transmission lines of various voltages have been built, including 3,250 kilometers of lines of intersystem voltages of 220-500 kilovolts. In order to provide power for the new oil fields on the Buzachi Peninsula of Mangyshlakskaya Oblast, 370 kilometers of electric power transmission lines and the necessary transformer capacities were built and put into operation in record time. By the mandates of the electors, Shevchenko-Fort-Shevchenko line was built. After the introduction of the 500 kilowatt Omsk-Petropavlovsk electric power transmission line, the reliability of electric power supply to the consumers of Severo-Kazakhstanskaya and Kokchetavskaya Oblasts improved considerably.

Introduction of new capacities definitely improves the supply to our consumers. However, in order to make the yield of these capacities as great as possible and the consumption of electric power rational, it is necessary to raise the level of management in the power industry. This problem is given much attention by the subdivisions of the ministry. For example, an automated system was introduced for determining the optimal operation mode of the equipment and improving the stability and reliability of the integrated power system of Northern Kazakhstan.

Computation centers were created in seven systems and the first sections of automatic control systems were introduced in four systems. Work on the introduction of the first section of the repubican automated control system ROASU -- "Energiya" has been started.

The new competition under the slogan "Not a Single Slow Worker Next to You" produced quite a few outstanding production workers. They include senior machine operators of the Karagandinskaya GRES-2 S. Klimuk and Dzhambulskaya GRES G. Ni, electric welder of "Sevkazenergoremont" Ye. Isabekov, and turbine operator of the Alma-Atinskaya TETs-1 A. Orlov. F. Ul'danov's brigade of centralized repairs at the enterprises of northern electric power networks of "Kustanayenergo" has already been working for half a year on the jobs planned for the Eleventh Five-Year Plan. Five brigades of the "Kazelektroset'stroy" Trust completed ahead of time the five-year goal for the volume of construction and installation jobs and introduction of electric power transmission lines.

While improving the supply of cheap energy to the consumers, we are not forgetting about social and domestic problems which have a direct influence on production affairs. During the past years of the five-year plan, nearly 350,000 square meters of housing facilities were built for the workers of this industry, as well as many children's preschool establishments, pioneer camps, dining halls, and stores. All this, in the final analysis, contributes to the stabilization of the workers and, consequently, their successful work.

Much has been done during the five-year plan. However, on the threshold of its final year, we must evaluate more strictly what has been achieved, reveal the available reserves, and isolate the main problems whose solution should be given primary attention. This approach is demanded from us by the Central Committee of the Party in its resolution "On the 110th Birthday of V. I. Lenin". These problems include further work on the creation of the Ekibastuz Fuel and Energy Complex. It will have five large GRES four million kilowatts each. At the present time, many thousands of installation, adjustment and operation workers are working at the construction of Ekibastuzskaya GRES-1. Many of them show examples of outstanding work and became leading workers of the five-year plan.

However, the state of affairs at this important construction site still does not meet the goals and, therefore, was justly criticized by Comrade L. I. Brezhnev, Secretary General of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet, in his speech at the November (1979) Plenium of the CPSU Central Committee.

At the present time, the necessary measures are being implemented for correcting the situation as soon as possible and overcoming the lagging. Round-the-clock intensive work was organized, and the first power unit is now in its prestartup stage. It is planned to make great improvements in the management system, to expand the construction personnel with builders of the most important skills, as well as to concentrate the resources on the priority projects. Operating workers of all power systems of the republic help considerably in the fulfillment of construction and installation jobs at the Ekibastuz Fuel and Energy Complex.

The just criticism of the builders and power engineers given at the XII Plenium of the Central Committee of the Communist Party of Kazakhstan in the report of the member of the Political Bureau of the CPSU Central Committee and First Secretary of the Central Committee of the Communist Party of Kazakhstan Comrade D. A. Kunayev is deemed by us to be timely and effective. It will help us to concentrate our efforts on the most important directions.

In order to develop further the energy base of the republic, to improve the reliability of power supply to the national economy and the population, and to ensure maximal economy of fuel, electricity, and thermal energy, it will be necessary for us to increase the creative activity of the personnel next year, and for each supervisor and worker to be concrete, businesslike, and responsible for the job entrusted to him and for his work section.

Power industry workers of Kazakhstan will do everything in order to fulfill the resolutions of the November (1979) Plenium of the CPSU Central Committee and the 12th Plenium of the Central Committee of the Communist Party of Kazakhstan, will do their best for successful materialization of the plans and socialist pledges of 1980 and of the five-year plan as a whole, and will mark the 110th Birthday of V. I. Lenin with new labor achievements.

10,233
CSO: 1822

FIRST POWER UNIT AT MOSCOW TETS-25 STARTED OPERATING

Moscow STROITEL'NAYA GAZETA in Russian 23 Jan 80 p 1

[Article by S. Borisov, correspondent of the Press Center of the USSR Ministry of Power and Electrification]

[Text] Yesterday, the first large power unit at TETs-25 started operating under an industrial load. The capacity of the Moscow power facilities increased by 250,000 kilowatts, due to which it is possible to provide heat and hot water for a residential area with a population of about 300,000.

According to I. Yershov, manager of Mosenergo [Moscow Regional Administration of Power System Management], this unit will improve considerably the reliability of the heat and power supply to the new regions of Moscow in Ochakovo, Kuntsevo, as well as in Cheremushki and Leninskiy rayon.

The new 250,000-kilowatt unit is the ninth in the country. But it differs from its predecessors. The operating workers, builders, installers, designers, and workers of the Ural Turbomotor Plant and "Krasnyy kotel'shchik" made a number of changes in the designs of the boiler unit and the turbogenerator. As a result of the modernization, the efficiency of the unit increased by 1.5%.

This unit will save 50,000 tons of fuel a year in comparison with the earlier units of 110,000 kilowatts. It is also more dependable in operation.

Moscow's needs in our "products" increase every year by 5-6 percent. In order to meet these needs, it will be necessary to put into operation 330,000 kilowatts of new capacities in 1980, including the second 250,000-kilowatt unit at TETs-25.

These are difficult problems. The workers of Mosenergo are doing their best to fulfill the goals of the Tenth Five-Year Plan and to celebrate V. I. Lenin's 110th Birthday appropriately.

10,233
CSO: 1822

PROGRESS ON ATOMMASH REPORTED

Moscow TRUD in Russian 24 Jan 80 p 1

[Article by A. Zornin, public correspondent of "Trud", Volgodonsk, Rostovskaya Oblast]

[Text] A new page opened up in the history of the leading enterprise of the domestic atomic machine building industry, Volgodonsk plant "Atommash": the assembly of the body of the first reactor has been started.

Competing under the slogan "Build Ahead of Schedule, Put into Operation Ahead of Schedule!", the builders and adjusters decided to shorten the deadline for the delivery of the project by six months and to complete the body of the atomic reactor during the first quarter of 1981.

The leading brigade in the competition for labor victories in the last year of the five-year plan was Leonid Sergeyevich Zimin's brigade of fitters and assemblers of the vessel equipment shop. They assembled the first unit of the reactor. This operation was preceded by many months of work by thousands of the plant workers. The workers of the shops of steam generators, nonstandard equipment, automatic equipment, industrial electronic equipment, and others, worked intensively. Each team tried to complete their job in a shorter time.

And the day came when the first unit of the reactor vessel was placed on the welding unit. According to the technology, it had to be preheated for many hours. Vladimir Nikolayevich Suslov watched the temperature carefully. This was understandable: the quality of the welded seam will depend greatly on this initial operation.

The personnel of the vessel equipment shop prepared for this event very thoroughly. At the brigade meeting, V. N. Suslov distributed the duties among the members of his team.

The association's personnel of many thousands is preparing a substantial gift to the country on the occasion of V. I. Lenin's 110th Birthday: they pledged to complete the assembly of two such units for his anniversary.

10,233
CSO: 1822

GEOTHERMAL ENERGY POSSIBILITIES IN DAGESTAN DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 16 Nov 79 p 3

[Interview by correspondents of "SOVETSKAYA ROSSIYA" D. Akhmedkhanov and A. Podol'skiy with representatives of the USSR Academy of Sciences and Dagestan SSR Gosplan]

[Text] The Dagestan Branch of the USSR Academy of Sciences is now playing a special role in solving important scientific and practical problems of the development of geothermal power engineering. At the request of the editorial board, Kh. I Amirkhanov, corresponding member and chairman of the presidium of the Dagestan Scientific Branch of the USSR Academy of Sciences, and A. G. Gadzhiyev, chairman of Dagestan SSR Gosplan, took part in the discussion on this topic.

Kh. I. Amirkhanov: In spite of the extensive reserves of the known fuel resources, the taming of the atomic nucleus for practical purposes, and other promising sources of energy, the problems of geothermal power engineering continue to be in the center of attention. The point is that the internal heat of the earth has no competitors from the economic point of view. As a rule, this heat is much cheaper than any other type of energy.

Let me put it this way: from the viewpoint of the physicist, our planet is a heat generator capable of working continuously for many millions of years. Energy resources "below" are simply astronomical. For example, one cubic kilometer of the earth at a depth quite accessible to man (3000 meters) is equivalent to approximately 40 million tons of conventional fuel.

In other words, we have an ocean of eternal energy under us. Now, it is unwise to be walking on the earth and not to realize that there is a source of heat under our feet. The energy problem is one of the most urgent problems of the twentieth century. Investigations are being conducted in the directions which seemed to be unthinkable even yesterday. The British Government is seriously interested in the wind energy and allotted funds for the development of large sail vessels. The Japanese are also engaged in the designing of unusual sail ships.

A. G. Dadzhiyev: This list of exotic projects can be continued. But, evidently, we should talk about more fundamental ways of solving the problem of our age. We have a different situation and a different approach to it. It is known that almost one-fifth of all fuel and energy resources of our planet is concentrated in the Soviet Union. They are being extracted at a sufficiently high pace. Our socialist system is capable of not only foreseeing the "weak spots", but also to eliminate recessions in critical situations which are characteristic of capitalistic countries. In this respect, the development of the geothermal program should be considered as a decisive stage in the development of a new branch of the national economy. It is recognized that it originated in Dagestan, where geothermal energy originally found its use for industrial, domestic, and agricultural purposes.

At the present time, the Kayakent, Terekli-Mekteb and Chervlennyye Buruny settlements are heated with thermal water. Each eighth resident in Makhachkala and each second resident in the cities of Izberbash and Kizlyar living in multistory buildings heat their apartments with geothermal energy. This energy is used for the needs of 100 industrial enterprises and organizations. And still the scope of this work does not meet the desired level.

Of course, the easiest thing to do is to find a "scapegoat" and say that the Caucasian Geothermal Industry Administration does not justify the hopes. But we know that in the past thirty years its control was transferred six times from one organization to another until, finally, it was placed under the control of "Soyuzburgaz" [All-Union Trust for the Drilling and Extraction of Gas]. However, as is known, this respectable organization is concerned chiefly with gas.

[Question] It seems to us that the lack of administrative coordination is caused by the fact that the ministries of the gas and petroleum industries, power engineers, and geologists still treat the internal heat of the earth as one of the secondary resources. In this connection, we would like to know your opinion about the experiment whose results were ranked on a par with the creation of the first atomic reactor by professor of the Leningrad Mining Institute Yu. D. Dyad'kin.

[Answer] Kh. I. Amirkhanov: I assume that the head of the Leningrad Laboratory of problems of mining thermophysics did not at all exaggerate the significance of the fact that underground nuclear explosions are not the only means of creating artificial cracks (a kind of thermal generators) deep in rock masses. The latest data confirm that it is possible to do without nuclear explosions. For example, it is realistic to create cracks in rock masses by cooling the shaft of a well with a circulating fluid for a long time. This method makes it possible even now to build geothermal electric power stations with a capacity of tens of thousands of kilowatts.

Unfortunately, we still do not know how to use the heat of the earth without water. And even if the earth itself does not supply it to us in the form of hot springs, we still pump water into underground boiler rooms, heat it up, and then pump the boiling water up to the surface. Of course, there are methods with different approaches. For example, Belorussian scientists are developing "heat pipes" capable of transferring energy even more intensively than, let's say, copper, which is the best conductor of heat. The Institute of Geothermal Power Engineering which is being created within the Dagestan branch will, of course, be thoroughly investigating the practical potentialities of "heat pipes" which can be several meters wide and driven directly into hot ash.

[Question] Then what is holding us up? Can you tell us when and what scientific-research and design organizations will submit blueprints of geothermal electric power stations or district heating systems to the builders?

[Answer] A. G. Gadzhiyev: This direct and pointed question was, evidently, addressed to me as a representative of the sphere of state planning. In the course of the preparation of the initial data for the draft of the main guidelines for the Eleventh Five-Year Plan and subsequent years, concrete tasks are assigned to a number of ministries and departments on the use of renewable sources of energy in the national economy. Among other things, it is planned to construct a testing facility in Dagestan in order to work out the scheme of future electric power stations thoroughly. For example, the Ministry of Geology is given the task of determining the available resources of thermal water and exploring regions with anomalous geothermal conditions. Oil industry workers will drill several deep wells for creating the first geotechnological systems. For example, they will drill a new well at the unique Tarumovskiy field.

Kh. I. Amirkhanov: Believe it or not, a mere mention of the Tarumovskiy field makes every scientist of our branch excited. In general, the Dagestan territory is promising for the extraction of the internal heat of the earth. Moreover, there are spots of anomalous release of the internal energy. For example, all geophysics textbooks mention a well in Berekeya which at one time yielded daily 70,000 cubic meters of boiling water, a whole river. And recently near the village of Tarumovka in the Dagestan steppes a well was drilled which started ejecting daily 12,000 tons of steem and brine, a mixture of various salts dissolved in water. Incidentally, this water from the depths of the earth is heated to 240 degrees. It can be easily calculated that with the thermal capacity of just one such well it is possible even today to build an electric power station for 100,000 kilowatts. And next to it there should necessarily be a plant for the processing of the hydromineral raw material which is very valuable with respect to its chemical composition. Here, it will be quite profitable to extract such elements as cesium, strontium, iodine, boron, rubidium, and many other rare elements from Mendeleev's periodic table.

I should mention that about 15 anomalies of this kind have already been discovered in Dagestan. And promising thermal areas occupy one fifth of the entire territory of the country. They are Northern Caucasus and Armenia, Southern Ukraine and Western Siberia, regions of Kazakhstan and the Northeast.

[Question] Dagestan scientists have already received several patents on inventions connected with thermal exploration and development of geothermal fields. But, on the whole, this matter is not moving fast enough and science is often ahead of production. What is the cause of this?

[Answer] A. G. Gadzhiyev: Of course, not all technical and, primarily, engineering problems have already been solved and not all barriers have been removed. This includes psychological barriers. But it will be possible to solve them successfully if one institution, for example, some union scientific and production association, will be in charge of the development of this new area of power engineering. This will make it possible to develop new methods and technologies, create instruments and design equipment, and, what is most important, there will be, finally, an organization to which you, journalists, and we, economists, will be able to direct our justifiable questions about practical results.

The internal heat of the earth is already serving the national economy, and the time has come for developing a large-scale geothermal program. We have eternal energy right under our feet.

10,233
CSO: 1822

ELECTRIC POWER

SEVENTIETH BIRTHDAY OF A.M. NEKRASOV

Moscow ELEKTRICHESKIYE STANTSII in Russian No 2, 1979 p 79

[Text] In March 1979, Andrey Mikhaylovich Nekrasov, one of the prominent power engineers of our country, chief of the Power and Electrification Department of the USSR Gosplan, will become 70 years old.

Andrey Mikhaylovich started working as an electrician in 1927. Having graduated from the Moscow Power Institute in 1934, he began working at the TETs-11 of Mosenergo [Moscow Regional Administration of Power Systems Management] as an engineer.

Great abilities, energy, industriousness a good practical experience as laboratory chief and shop chief served as a basis for appointing A.M. Nekrasov as deputy chief engineer and soon after as chief engineer of this TETs. During the difficult years of the Great Fatherland War, as technical leader of TETs-11, he made a great contribution to supplying continuous electric power and heat to the capital and also fulfilled successfully a number of important special tasks in leading the USSR Narkomat [Peoples Commissariat] of Electric Power Plant, exhibiting great organizational talent. In 1942, Andrey Mikhaylovich joined the Communist Party.

In 1946, A. M. Nekrasov was made chief engineer and then director of the Scientific Research Institute of Direct Current in Leningrad. Here under his direct guidance, a complex of insulations and apparatus for high voltage electric power transmission lines, not used previously in the USSR, was developed successfully.

In 1953, A. M. Nekrasov headed the Technical Administration of the USSR Ministry of Electric Power Plants. Being a board member of the ministry and having extensive knowledge, high technical erudition and engineering daring, Andrey Mikhaylovich actively conducted the technical policy directed toward further progress in Soviet power engineering. In that time, thermal power was changed to steam parameters of 130 kg-force/cm^2 at 565/565°C, new, very large hydroelectric power plants were built and the efficiency of the industry increased sharply.

In 1959-1960, A. M. Nekrasov was chief engineer of the Teploelektroproyekt Institute where, under his guidance, a number of new progressive designs was developed directed toward developing and improving domestic electric power.

In 1960, Andrey Mikhaylovich as a highly skilled power engineer, with a great deal of experience in designing and operating power systems, as well as in the area of scientific investigations in electric power engineering, was promoted to working in central planning organs -- as deputy chief of the department, first in the Gosekonomsovet and, since 1963, in the USSR Gosplan.

Since 1975, A. M. Nekrasov has headed the Power and Electrification Department of the USSR Gosplan.

By his comprehensive knowledge, extensive understanding of power engineering and electrification problems, his creative approach to work, inexhaustible initiative, the urge to find solutions to originating problems no matter how complicated they were, Andrey Mikhaylovich has earned great authority. He is greatly respected by power engineers in the country and by all who worked and associated with him.

A. M. Nekrasov participates actively in the work of the Council for Mutual Economic Aid [CMEA] and is the leader of a standing working group on the fuel-power balance at the bureau of the CMEA Executive Committee.

Andrey Mikhaylovich Nekrasov generously shares with his knowledge and expereince. He has written dozens of papers. He gave much effort to training cadres of power engineers, heading the Economics Chair at the Moscow Power Engineering Institute.

At the same time, Andrey Mikhaylovich is doing a great amount of social work in the USSR Gosplan, in the "Znaniye" Society. For over 25 years, as chief editor and deputy chief editor, he has actively and creatively been working at the ELEKTRICHESKIYE STANTSII journal.

Andrey Mikhaylovich was always distinguished by his sensitivity and love of people, his humanity, simplicity and great modesty.

For his services to the Fatherland, A. M. Nekrasov was awarded the Order of the Red Star, two "Znak Pocheta" orders and many medals. He was awarded the honorable title of Merited Power Engineer of the RSFSR.

In congratulating Andrey Mikhaylovich Nekrasov, we wish him new creative successes for the welfare of Soviet power engineering, good health and happiness.

COPYRIGHT: Izdatel'stvo "Energiya", "Elektricheskoye stantsii", 1979

2291
CSO: 1822

ENERGY CONSERVATION

EFFICIENT HANDLING OF FUELS, LUBRICANTS DISCUSSED

Moscow VOZDUSHNYY TRANSPORT in Russian 17 Jan 80 p 2

/Article by correspondent T. Nikitina: "NOT /Scientific Organization of Labor/ Guarantees Fuel Economy and Quality"/

/Text/ Tallin--A GSM /fuels and lubricants/ service must work like a clock in any season. Winter makes no allowances for either difficulty in delivery and unloading of fuel or the lack of capacities for its storage.

The GSM service of the Estonian Republic Production Association prepared itself well for the cold weather. Renovation of warehouse facilities were completed and a rail loading ramp were built as far back as the beginning of fall and winter navigation.

"The work carried out," said A. Listopad, chief engineer of ground services of the association, "means a great deal for our subunits. This is reduction of fuel losses and unloading times and improvement in aviation workers' working conditions. It cannot be said that affairs went well at this project right away. The contractor--SU-8 /Construction Administration-8/ of the Tallinstroy Trust--held up commission for 2 years. Much effort had to be applied to move the construction off 'dead center.' The Ministry of Civil Aviation and local party and soviet organs helped us in many respects."

Now the renovated rail loading ramp is making it possible to receive not five or six tank cars, but an entire train of 20 or 30 cars...

The procedure for pumping fuel out of tank cars into reservoirs has been improved. Until quite recently, with one standpipe available, workers of the GSM service were handling just one tank car in an hour, and at times the association paid fines for cars' idle times. But now, with four new standpipes and high-output pumps, four tank cars are emptied in an hour and a half.

A new container depot ensures reliable preservation of the fuels and lubricants, improves working conditions and operational distribution of lubricants, oils and special liquids. The automated system for fueling vehicles here will not permit underfilling or overflowing. A warehouse worker need only set a specific number on the panel, and the automatic equipment itself will release the amount of fuels and lubricants that are exactly needed. Also, five special vehicles can be fueled at the same time at the renovated depot with different types of fuels and lubricants. In this way, labor productivity in this operation has increased fivefold, and this has a positive effect on ensuring flight regularity and smoothness and coordination in the work of all services.

As a result of the renovation, the quality of fuels and lubricants released also has improved. The ST-2500 filter-separators make it possible to ensure 100-percent removal of water and mechanical impurities. This is very important under weather conditions in the Baltic region. Filters for preliminary purification and floating fuel-intake devices--all this also is a guarantee of the high quality of fuels and lubricants.

A considerable contribution to the scientific organization of labor in the fuels and lubricants service is being made by its chief, V. Nikolayev, an active innovator; engineer A. Kalinin; fitter G. Yarushkin, who has mastered several related occupations and who works excellently in handling fuels as a mechanic, diesel operator and electrician; and drivers of the special motor transport service I. Kistritsa, V. Dodin, D. Kanivets, A. Lozhenitsyn, A. Kulinchenko, and others.

Estonian aviators understand well that a zealous, careful attitude toward every gram of fuel yields tons of savings.

8936
CSO: 1822

ENERGY CONSERVATION

MORE EFFICIENT PETROLEUM REFINING DISCUSSED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Dec 79 p 2

[Article by N. Valitov, chief engineer of the "Bashneftekhimzavody" [Bashkir Petroleum and Chemical Plants] Association: "Thorough Refining"]

[Text] Ufa--The enterprises of our association, which have large capacities for refining petroleum, are steadily increasing output volume. But this is not enough today. A different, more efficient approach to the use of raw material is required. In fact, increasing the production of crude oil will yield little if a substantial part of it is burned up in the form of fuel oil instead of using it to obtain more valuable forms of fuel and petrochemical products. Comrade L. I. Brezhnev spoke about this in his speech at the November (1979) Plenum of the CPSU Central Committee.

This means that everything needed must be taken from the raw material--in other words, the recovery of valuable components must be expanded. By this means, additional millions of tons of gasoline, diesel fuel and other products can be obtained for the national economy every year.

The collectives of our enterprises, in collaboration with scientific research and planning institutes, have developed a program for the next few years to extend the refining of raw material by 30-35 percent. The first steps to implement what has been outlined already have been taken.

For example, specialists of the Novo-Ufimskiy Oil Refining Plant, with the assistance of scientists, have developed unique contact catalysis units [kontaktnyye ustroystva] which can crack petroleum most effectively. They are simple in design, manufactured by the forging method and practically without waste. In the towers of the AVT [atmospheric-vacuum pipe still] installation, where the new cracking units have been mounted, the productivity of equipment has been doubled. Recovery of light petroleum products and oil fractions has been increased noticeably, and three times more vaccum gas oil--of the best quality, moreover--is being obtained.

At the same time, one cannot help but mention that the new contact catalysis units are still not in wide use. Units of a similar type also have been developed by the VNIIneftemash /State Scientific Research and Planning Institute of Petroleum Machinery Manufacture/. Here is not the place to discuss which design is better, of course. Although ours is more economical, as practice has demonstrated. Nevertheless, we can by no means receive the "go-ahead" for series output of our contact catalysis units. Very few such units and designs are being turned out by VNIIneftemash. In the final analysis, this leads to the point where plants are not able to organize extended refining of raw material and valuable petroleum products worth millions of rubles are being lost every year.

One of the most effective methods of extending the refining of petroleum is the so-called retarded coking of petroleum tar. This process makes it possible to obtain more gasoline, diesel and boiler fuel, gas and petroleum coke in addition. Something should be mentioned about the latter, in particular. As long as petroleum with high sulfur content is being extracted in the Bashkir ASSR, up to 30 percent of this product, including the type that can be compressed into briquets, is being produced by retarded coking.

The process of obtaining petroleum coke at our enterprises has been checked out efficiently and added to the technology harmoniously. One thing is bad: there are few such installations. Meanwhile, petroleum coke is successfully competing with metallurgical coke and is being used in smelting nonferrous metals. Just the plants in the Urals can obtain several million tons of it every year.

More than once we have appealed to the USSR Ministry of Nonferrous Metallurgy with a request to more precisely define the true demand for this output. But the ministry is slow to respond. And this in turn delays solution of the problem of building new retarded coking installations in the plants of the Bashkir ASSR.

And in fact, coke is needed not just by nonferrous metallurgy enterprises. With retarded coking of all the petroleum tar produced, millions of additional tons of the components of gasoline, diesel fuel and other products can be obtained every year.

There is one more important resource—renovation of operating industrial equipment. Replacement and modernization of refining machinery makes it possible to obtain significantly more light petroleum products from every ton of raw material with relatively small capital outlays. The experience in renovation at our plants is quite good. But we cannot do everything; more effective assistance is required from the USSR Ministry of the Petroleum Refining and Petrochemical Industry. It is especially important to expand capacities for the output of electrode coke, the demand for which is increasing.

But this entire chain will not be fully complete if underground depositories are not constructed. This is the situation here. Large drops in the consumption of light petroleum products develop, depending on the season. The demand for them is less in the winter, but during field work shipment increases significantly. With underground depositories, fuel can be stored in them and when necessary, pumped through pipelines in the directions needed. This provides a guarantee of smooth delivery and will save much capital--in fact, many millions of rubles are being spent now on the construction of capacities at plants and bases.

8936
CSO: 1822

FUELS

LATVIAN PEAT INDUSTRY REPORT

Riga SOVETSKAYA LATVIYA in Russian 23 Jan 80 p 2

[Article by G. Ozols, Deputy Chief, Peat Industry Administration, Latvian SSR Council of Ministers: "With a Purposeful Approach"]

[Text] A far-reaching and profound analysis of the most pressing of the economy's problems with a broad vision of developmental prospects was provided in the speech of comrade L.I. Brezhnev at the November (1979) CPSU Central Committee Plenum. The directives voiced at this Plenum are of extreme value for all sectors of the economy. We, as peat producers, consider particularly important for us a more rational utilization of organic raw material natural resources and their employment for the needs of industry and agriculture.

Peat is used not only for fuel. Almost one-half of the annual production is used in Latvia by kolkhozes and sovkhozes. During the Tenth Five-Year Plan, a trend became more pronounced--reduced deliveries of fuel peat and a corresponding increase in volumes used of this organic raw material in the livestock and field crop sectors. Latvian mossy peat is becoming evermore popular on the world market; our industry is now producing it for export. This peat has proven itself to be an outstanding base for preparing various feed nutrient mixtures which are employed in vegetable growing and orchard operations.

The annual production of organic raw materials has stabilized in our republic at a level of 3 million tons. If that quantity is converted to a volume indicator, it is equal to 15 million cubic meters. Is this a great or small amount?

The annual plan for our enterprises was intensive. Suffice it to say, that due to extremely unfavorable weather conditions of the past season, only three of the country's peat producing republics were able to meet their annual goals. Those were the Ukraine, Belorussia, and Latvia.

The peak load in the peat-producing fields comes, as a rule, in July and the beginning of August. However, May and June were conducive to operations, and our enterprises, not waiting for a better time, dynamically and without shake-up, during this very period adopted an accelerated rate of production. As one can see, such a calculation proved to be singularly accurate.

Communist party members were the initiators of the accelerated labor rates. I would like to cite as an example the work of the party organization of the "Seda" peat plant, which earlier assumed the supervision of the entire preparation procedure for enterprises readying for the new season. Here particular attention was devoted to correct staffing of personnel for all sectors of the peat production line without exception. There were no trivial matters for the plant director, Z. Dreymanis, or for the party organization secretary, Merasmus in this important matter. The enterprise collective was the first among other plants to fulfill its annual plan and to assume an additional quota for peat production. Through its successful fulfillment, "Sedy" and its peat producers assisted the entire sector in meeting the annual task.

Mention must be made also of the efforts of party members and the entire collective from the peat plant "Struzhany", whose successes were displayed at the USSR VDNKh in 1979. The plant was awarded the VDNKh Diploma. This is an even more encouraging situation, when one considers that relatively recently, "Struzhany" was a lagging enterprise.

Socialist competition has assisted us in achieving the forefront. It was organized both among our enterprises as well as among allied collectives from other union republics in the country. A particularly effective form of competition has proven to be labor rivalry among machine operators who play a decisive role in fulfilling the peat production plans. Best results for the past season were attained in the industry by such operators as communist party member Ye. Ragilo, from the "Seda" plant, who produced a record output in cut peat, Komsomol member A. Vrublevskiy from the Olayne Peat Plant, and A. Zdanovskiy and Ya. Zibers from the "Struzhany" and "Balozhi" peat plants.

Winter is a time of most intensive shipping of peat to the customers. Columns of vehicles transport the organic raw material from the place where it is stockpiled to the fields, farms and enterprises. Delivery schedules are maintained under particularly stringent supervision for fuel peat which is delivered to Riga central heating facilities, Sloka paper industry workers, and Livany chemical workers.

Nevertheless, I should like to state that the intensification of organic raw materials shipping during winter time is not the most advantageous approach from the standpoint of economy. The quality of the peat would be higher, and losses significantly lower if peat deliveries were established evenly over the course of the entire period. The fact is, that peat which is stacked in huge stacks heats up, and loses its initial capability to absorb moisture, which considerably degrades its quality as a bedding material for farms.

Communist party members of the sector consider that the time has now arrived to more quickly activate specialized transportation detachments in the republic for the delivery of peat over the duration of the entire production season. Losses of this raw material in transport can be significantly reduced, if use is made of high-load, covered vehicle bodies which are capable of carrying not 10 cubic meters of the organic material as is now the case, but twice the amount. Incidentally, this is just the sort of specialized transportation our neighbors in Estonia are now using. Their know-how deserves our implementation.

Peat resources in Latvia are vast. It cannot be forgotten, however, that they are reduced with the passing of every year. The peat which we are now extracting, has an "age" of several thousand years. Afterall, the peat deposit, not included in a developed area, grows at a very frugal rate—1 millimeter per year.

Today, we can no longer totally deny the requirements of peat for fuel. Therefore, fuller utilization of existing capabilities of peat briquet production in our plants in Struzhany, Olayne and Balozhi, which produce fuel for our population is of extreme importance.

For example, the plant in Struzhany could double its production of peat briquets. Reserves also exist at other plants. However, to achieve this, it is necessary to accelerate the draining and preparation of new marsh areas for the production of cut peat, which is accomplished through the efforts of the Ministry of Reclamation and Water Resources and the republic Ministry of Local Industry. Both ministries consistently fail to fulfill operational plans for the introduction of new peat-production capacities. This situation in turn seriously restrains our capabilities to increase delivery of fuel to the populace and of organic materials to agriculture.

In light of the resolutions of the November (1979) Central Committee, CPSU Plenum, where it was emphatically emphasized that a necessity exists for the careful and economical use of natural resources, and there are many tasks which must be resolved in the near future by our production collectives in the industry. First and foremost, serious considerations must be given to the expansion of the range of products derived from peat. This organic raw material has great possibilities for use in the economy.

It is apparent that the time has come for our specialists to concern themselves more resolutely than in the past with practical problems involved in expanding the production of cut mossy peat for preparation of soil nutrient mixtures. The demands for this product are great. Further, a new sector of production, fundamentally new in approach, must be organized in the republic—that of chemical processing of peat for obtaining fodder and fodder yeasts for livestock industry needs.

In taking the valuable organic materials, we must preserve the natural reserves, and show concern for the restoration of fertility to the sectors which have been worked and developed. Today, the concern for preserving nature and the earth has advanced to the status of a government-wide and party task. We have, in our republic, more than 7,000 hectares of peatworks which have been developed. We have to return this entire area to economic turnover, and to make it fertile.

Planning of restoration work in the field areas is already underway for the areas in which peat was once produced. During the Eleventh Five-Year Plan, these operations will begin in large areas. They are envisaged as effective in our republic through a comprehensive program for the utilization of peat deposits.

Peat is one of the many riches of the Latvian natural resources. Production today has been brought up to the demands of scientific-technological progress. Everyone who works in this industry displays constant concern for the conscientious and expert utilization of each ton of raw materials which nature over many centuries "prepared" for us and future generations.

8851
CSO: 1822

FUELS

UDC 553.98.041:551.24(571.5)

OIL PROSPECTS FOR SIBERIAN PLATFORM AREAS WEIGHED

Moscow NEFTEGAZOVAYA GEOLOGIYA I GEOFIZIKA in Russian No 11, Nov 79 pp 3-8

[Article by A. A. Bakirov, N. M. Muzychenko, A. N. Dmitriyevskiy, V. N. Gurov, Yu. V. Samsonov and A. V. Shashin of MINKh i GP [Moscow Institute of the Petrochemical and Gas Industry] imeni I. M. Gubkin: "Oil and Gas Geology Regionalization of the Siberian Platform with Regard to the Prospects for the Presence of Oil and Gas"]

[Text] The high pace of development of the USSR's oil and gas industry requires the creation of new oil and gas producing centers, especially in the country's eastern regions.

The 25th CPSU Congress decided that one of the most important tasks of geological exploration during the Tenth Five-Year Plan was acceleration of the discovery and exploration of new oil, natural-gas and gas-condensate fields in East Siberian regions and in Yakutia.

Because of this, and as indicated in the works of A. A. Bakirov [1 and 2], further intensification of development of the scientific bases for forecasting the oil and gas content of the earth's depths and for evaluating the predicted hydrocarbon resources with a view to identifying the regions and zones of maximum concentration thereof, acquires great importance, that is, the role of oil and gas geology regionalization is raised.

In accordance with the decision of the All-Union Conference on the Principles for Oil and Gas Geology Regionalization that related to forecasting the oil and gas content of the earth's depths [8], the basis for oil and gas geology regionalization should be the tectonic principle, with delineation of the oil and gas bearing provinces and districts and the regions and zones of oil and gas accumulations that are confined to various classes and types of the largest and of large elements of geological structure, which are characterized by their peculiarities of geological formation and history of geological development, and, therefore, also by conditions for the regional formation and accumulation of oil and gas.

The tectonic-structure regionalization of the Siberian platform has been done on the basis of a set of geological and geophysical operations, and it has been reflected in tectonic regionalization maps published in recent years, as well as in the geological literature [3-7].

A tectonic regionalization of the Siberian platform was performed by the authors on the basis of a tectonic structure scheme constructed in accordance with the data of a number of production and scientific organizations (Krasnoyarskneftegazrazvedka [Krasnoyarskiy Kray Oil and Gas Exploration Trust], Yakutneftegazrazvedka [Yakutsk ASSR Oil and Gas Exploration Trust], VGT, VSGU, SNIIGGIMS [Siberian Scientific-Research Institute for the Geology, Geophysics and Mineral Raw Materials], VNIGRI [All-Union Petroleum Scientific-Research and Geological Prospecting Institute] and others).

The Baykit, Kureyka-Kheta and Angara-Botuoba anteclises were singled out under this scheme, along with the previously identified Tungusska, Sayany region-Yenisey and Vilyuy syneclises and the Anabar and Aldan anteclises [see figure].

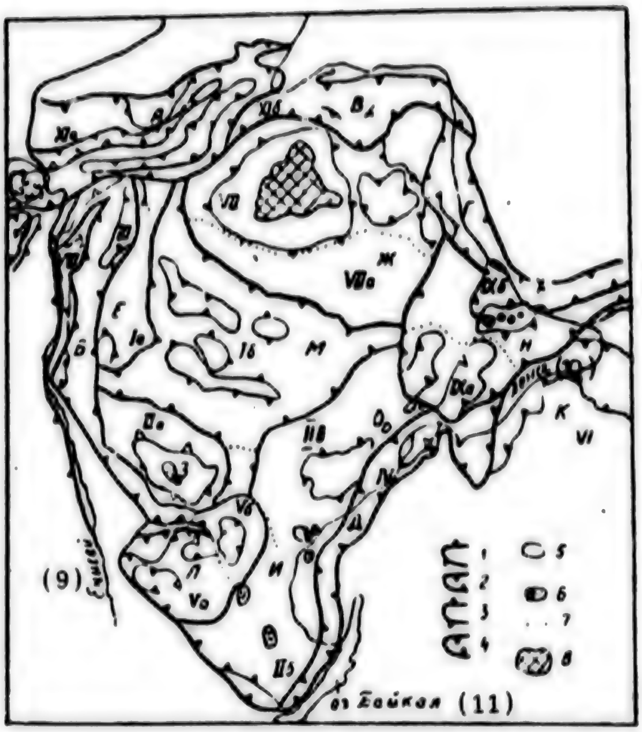
Geologists of Krasnoyarskneftegazrazvedka singled out the Baykit anteclise for the first time in 1977 in the Vostochno-Yenisey fault bench area. This became possible after confirmation of the data about its system's bordering large negative structures (the Nizhnyaya Tungusska and Tera megatroughs) from the Yenisey ridge.

Considerable differences exist in determining the spatial borders of the Baykit anteclise. On the tectonic-structure map of the western part of the Siberian platform (Yu. A. Sharygin and L. A. Manuylova, 1978), the Baykit anteclise included the Suringdakon and Tutonchany vaults, which are situated 1,500-1,600 meters hypsometrically lower than the Kamovskiy vault--the most uplifted part of the anteclise. Other researchers [4] bound the northern end of the Baykit anteclise with the Suringdakon vault.

In the authors' opinion, inclusion of the Suringdakon and Tutonchany vaults in the Baykit anteclise is artificial. Not only the different hypsometric position of these structures but also the substantial difference of their geological cross-section in comparison with the more southerly regions of the anteclise testify to this. In the saline carbonaceous cross-section of the anteclise's central part, the Motskaya, Usol'skaya, Bel'skaya, Bulavskaya and other Cambrian suites are singled out with the Kamovsky vault, by analogy with Irkutsk amphitheater regions; in the synchronous portions of the Suringdakon vault cross-section, the Platonovskaya and Kostinskaya suites, which are characterized by a lack of salt are singled out. In this connection, the authors bound the northern periclinal end of the Baykit anteclise with the Bakhta semivault.

The submeridonal uplift zone that is located more to the north and includes the Suringdakon, Tutonchany, Anam and Ledyan vaults, which are situated sequentially from north to south, has been isolated out into the independent Kureyka-Kheta anteclise.

Diagram of the Tectonic and Oil- and Gas Geology Regionalization of the Siberian Platform. (Compiled by A. A. Bakirov, N. M. Muzychenko, A. N. Dmitriyevskiy, V. N. Gurov, Yu. V. Samsonov, A. V. Shashin and A. P. Dement'yev in accordance with data of production and scientific-research organizations of USSR Mingeo [Ministry of Geology] and RSFSR Mingeo.



Borders of structural elements:
1. Anteclise.
2. Syneclise of regional troughs.
3. Vaults.
4. Depressions and megatroughs.

Deposits:
5. Gas.
6. Gas and oil.

7. Borders of oil and gas-bearing districts.
8. Outcrops of crystalline basement rocks.
9. Yenisey.
10. Lena.
11. Lake Baykal.

Oil and Gas Bearing Subprovinces (NGSP's) and Oil and Gas Bearing Districts (NGO's) of the Lena-Tungusska Province:

Nizhnyaya Tungusskaya NGSP:
Ia. Kureyka-Kheta NGO.
Iб. Kochechum-Nidym NGO.

Baykit-Nepa NGSP:
IIa. Baykit NGO.
IIб. Angara-Lena NGO.
IIв. Nepa-Botuoba NGO.

III. Tera-Nizhnyaya Tungusska NGSP.
IV. Baykal region-Lena NGSP.

Sayany-Yenisey NGSP:
Va. Dolgomostov-Mura NGO.
Vб. Katskaya NGO.

VI. Severo-Aldan NGSP.

VII. Anabar NGSP:
VIIa. Yuzhnyy Anabar NGO.
VIII. Turukhan-Noril'sk NGO.

Oil and Gas Bearing Subprovinces and Oil and Gas Bearing Districts of the Khatanga-Vilyuy Gas and Oil Bearing Province:

Lena-Vilyuy NGSP:
IXa. Zapadnyy Vilyuy NGO.
IXб. Vilyuy NGO.

X. Verkhoyansk regions NGSP:
XIa. Yenisey-Khatanga NGO.
XIб. Lena-Anabar NGO.
Regional troughs:
A. Yenisey-Khatanga.
Б. Tera-Nizhnyaya Tungusska.
B. Lena-Anabar.
Г. Verkhoyansk region.
Д. Baykal region-Lena.

Anteclises:
E. Kureyka-Kheta.
Ж. Anabar.
З. Baykit.
И. Angara-Botuoba.
K. Aldan.

Syneclises:
Л. Sayany region-Yenisey.
M. Tungusska.
H. Vilyuy.

The Angara-Botuoba anteclise includes the Nepa-Botuoba anteclise and the Angara-Lena fault bench. It had been singled out previously under the name Angara-Anabar (or Angara) anteclise (V. G. Vasil'yev and others, 1968; Zamarayev, 1967; M. P. Grishin and others, 1967; and O. I. Karasev and others, 1971).

In addition to the system of Mesozoic depressions to the north and northeast of the platform (the Yenisey-Khatanga and Lena-Anabar regional troughs and the Verkhoyansk foredeep), a system of negative structures to the west of the Siberian platform (the Tera, Fat'yanikhov, Nizhnyaya Tungusska and Dyupkun megatroughs and the Noril'sk-Vologochan depression is isolated into the single Tera-Nizhnyaya Tungusska regional trough. Moreover, negative structures in the platform's zone of articulation with the Baykal-Patom folded structure (the Berezov, Nyuya-Dzherba, Kazach'ye and Verkhnyaya Lena megatroughs) were isolated into the single Baykal area-Lena (or Patom area) regional trough.

In recent years the oil-geology regionalization of the Siberian platform territory has found reflection in collective works published by editors V. D. Nalivkin and S. N. Simakov (1974), V. V. Semenovich (1976), L. I. Rovnin, V. V. Semenovich and A. A. Trofimuk (1976), A. E. Kontorovich, N. V. Mel'nikov and V. S. Starosel'tsev (1974 and 1976). Separate oil and gas bearing districts and regions have been singled out in this territory by M. K. Kalinko, I. P. Karasev, M. M. Mandel'baum, A. A. Trofimuk, D. S. Sorokin and others [6 and 7].

In accordance with existing views and in light of development of the principles of oil and gas geology regionalization of the Siberian platform that were reflected in the works indicated above, the authors retain the identification of two oil and gas bearing provinces--the Lena-Tungusska and the Khatanga-Vilyuy--within the platform.

On considering the extremely great sizes of the geological structure elements that are associated with the following classes of land that show promise with regard to oil and gas, as well as the similarity in geological structure and history of development, the presence of gas and oil and the thickness and depth of occurrence of oil-geology complexes and promising complexes, subprovinces were singled out within the provinces. In accordance with tectonic geological regionalization, the Nizhnyaya Tungusska, Baykit-Nepa, Anabar, Severynyy Aldan, Sayany region-Yenisey, Tera-Nizhnyaya-Tungusska and Baykal region-Lena oil and gas subprovinces were singled out within the Lena-Tungusska oil and gas bearing province, and the Lena-Vilyuy, Verkhoyansk region and Yenisey-Anabar gas and oil bearing subprovinces were singled out within the Khatanga-Vilyuy gas and oil bearing province (see figure).

Classes of lands (or districts) that hold promise of oil and gas were singled out on the basis of the geological tectonic principle, taking into account peculiarities of the structure of the oil and gas bearing zones, the consistency of the distribution of oil and gas deposits by area and by cross-section, and the matching of the oil and gas bearing complexes and the main productive horizons.

The Lena-Tungusska oil and gas bearing province includes seven subprovinces.

The Nizhnyaya-Tungusska subprovince, which is promising with regard to oil and gas, was singled out for the first time. It corresponds to the eastern part of the Severnaya Tungusska oil and gas bearing district and the northern part of the Khatanga oil bearing district, according to the schemes of V. V. Semenovich (1976) and L. I. Rovnin, V. V. Semenovich and A. A. Trofimuk (1976). On the whole, the subprovince occupies the land of the Tungusska syneclise and the Kureyka-Kheta anteclise.

In the Lower Paleozoic structure plan the Tungusska (the Evenki and Kureyka, according to Yu. A. Sharygin, 1978), the syneclise is a vast depression of northwestern trend with a maximum depth of occurrence of the basement of 6 km. The most submerged sections of the syneclise are isolated into the independent Tembenchi and Tura depressions. The larger positive elements that complicate the anteclise include the Kochechum, Nidym and Tura vaults.

The Kureyka-Kheta anteclise has a submeridional trend and occupies the northwestern part of the Siberian platform, separating the more submerged portion of the Tungusska syneclise--the Tembenchi depression--from the Tera-Nizhnyaya Tungusska regional trough, which is located in the western edge portion of the platform. Its dimensions are 700x800 km, and its amplitude is less than 400-500 meters. Previous study of the subprovince's land by deep drilling has been very small--only solitary holes have been drilled here. Drilling density by the start of 1978 was about 0.03 m/km^2. Because of this, the prospects that the vast land of the Siberian platform bears oil and gas has not been studied completely.

The main prospects for the presence of oil and gas should be associated with the vault uplifts of the Kureyka-Kheta anteclise and with the side portions of the Tungusska synclise. The northern regions of the indicated tectonic elements, where formations of the Paleozoic are submerged to the side of the Yenisey-Khatanga regional depression, deserve special attention.

Two promising oil and gas bearing districts--the Kureyka-Kheta, which is confined to the anteclise of the same name, and the Kochechum-Nidym, which occupies land of the Tungusska syneclise--have been singled out for the first time in subprovinces.

The Baykit-Nepa oil and gas bearing subprovince embraces the area of the Yuzhnyaya-Tungusska oil and gas bearing district, the southern part of the Khatanga oil and gas bearing district, and the Angara-Lena and Nepa-Botuoba oil and gas bearing district (L. I. Rovnin and others, 1976). Geotectonically, it was confined to the Baykit and Angara-Botuoba anteclise and to the Khatanga saddle, which divides them.

The Baykit anteclise extends in a northwesterly direction and its amplitude exceeds 500 meters. The Kamovskiy vault and the Bakhta semivault are the larger structures of the first order that complicate it. The Angara-Botuoba anteclise is marked by a distinctly expressed northeasterly trend. Its dimensions are 300x1,500 km and its amplitude is less than 1,000 meters. The authors singled out the more uplifted part of the anteclise into the single Nepa-Peleduy vault. Drilling density in the subprovince is 1.9 m/km^2. The ground being examined has been studied extremely unevenly by deep drilling. The Nepa-Peleduy vault and its slopes, and the slopes of the Kamovskiy vault, as well as the Baykit and Angara-Botuoba anteclises, which face the Tungusska syneclise and the contiguous regional troughs (the Tera-Nizhnyaya Tungusska and the Baykal region-Lena, respectively) and are of great interest with regard to promise for bearing oil and gas, have been studied by drilling extremely poorly.

Ten deposits (seven of gas, three of gas and oil) have been discovered in the subprovince. Moreover, at 13 exploratory sites, industrial flows of oil or gas in wells have been obtained.

The subprovince includes three oil and gas bearing districts: the Baykit (the anteclise of the same name), the Nepa-Botuoba (the northern part of the Angara-Botuoba anteclise) and the Angara-Lena (its southern part). These oil and gas bearing districts were singled out earlier in the schemes of a number of researchers but in somewhat larger amounts.

The promising Anabar oil and gas bearing subprovince corresponds in tectonic plan to the Anabar anteclise and practically corresponds to the grounds of the Anabar oil and gas bearing district. The Anabar anteclise, which is expressed in the form of a vast uplift with outcropping of the crystalline basement on the exposed surface in the central part, has been located on the northeastern platform and is complicated by a number of large vault uplifts (the Olenek, Muna and Anabar), troughs and depressions (the Khan'in megatrough and the Sukhan depression). The subprovince's land has practically not been studied by deep drilling. Drilling density has been $\sim$0.003 m/km^2.

The southern slope of the anteclise, where the promising Yuzhno-Anabar gas and oil bearing district has been singled out, merits special attention.

Three shows of oil from Lower Cambrian sediments (the Kenelekan springs) are known in the southern part of the subprovince. Cambrian sediments in the basins of the Olekma, Anakita and Siligir rivers are saturated with bitumens. Substantial shows of bitumens are known in Permian sediments on the northern slope of the Olenek vault [7].

The promising Severnyy Aldan oil and gas-bearing subprovince corresponds greatly to the lands of the Severnyy Aldan oil and gas bearing district, with the exception of the Berezov megatrough and the northern part of the district, which stretches toward the Vilyuy syneclise. The subprovince is situated in the southeastern part of the platform and corresponds tectonically to the northern slope of the Aldan anteclise, a distinctive peculiarity of which is the one-winged nature of the structure, with an accurately expressed development only of the northern slope of the Aldan shield, which is complicated by the Tolba shelf, the Omnya and Yakutsk vaults and the Aldan-Maya depression.

The subprovince has been studied by deep drilling only to a very small extent. At the start of 1978, drilling density was 0.03 m/km^2.

A short-term influx of gas with a flow of up to 100,000 m^3 per day was obtained at the Russka-Recha area of the subprovince. Moreover, oil-saturated sandstones have been found in some areas (the Chemkiyam and the Namana) in basalt horizons of the Cambrian.

The Sayany region-Yenisey oil and gas bearing subprovince corresponds fully to land of the Sayany region-Yenisey oil and gas bearing district, and it corresponds in tectonic plan to the syneclise of the same name, which joins the Dolgomostov, Mura-Chuna and Katskaya troughs. The syneclise is situated to the west of the Angara-Botuoba anteclise. It is not comparatively large in size. The amplitude of its trough is more than 3.0 km.

Two promising oil and gas bearing districts have been singled out within the subprovince: the Dolgomostov-Mura and the Katskaya. The promise of the presence of oil and gas is associated with the side portions of the troughs which complicate the syneclise.

The promising Tera-Nizhnyaya Tungusska oil and gas bearing subprovince has been singled out for the first time. It occupies land of the western part of the Severnaya Tungusska and Yuzhnaya Tungusska oil and gas bearing districts, and it corresponds in tectonic plan to the Tera-Nizhnyaya Tungusska regional troughs that the authors singled out, which is situated in the zone of articulation of the Siberian platform with the Yenisey fold district and Yenisey regional linear dislocations. It is a large negative structure drawn out in a line that joins the Dyupkun, Nizhnyaya Tungusska, Fal'yanikhov and Tera megatroughs and the Noril'sk-Vologochan depressions. The trough is 1,500 km long, and its width in different parts varies from 50 to 150 km. The depth of submergence of the bottom of the Cambrian deposits increases from 2.0-2.5 km in the south to 4.0-4.5 km in the north. The province's area has been studied poorly. Holes have been drilled here only at the Lebyazh'ye, Listvinich, Bolgokhtokh and Yuzhnaya Pyasina areas. Drilling density has been no more than 0.08 m/km^2.

The side portions of the megatroughs indicated above should be considered primary targets for prospecting and exploratory work.

The promising Baykal region-Lena oil and gas bearing subprovince has been singled out for the first time. It occupies a narrow belt along the Patom uplands of the Angara-Lena, Nepa-Botuoba and Severnyy Aldan oil and gas bearing districts, and it corresponds in tectonic plan to the regional trough of the same name, which includes the Verkhnyaya Lena, Kazach'ye, Nyuya-Dzherba and Berezov megatroughs. The depression is more than 1,250 km long, at widths of 30-125 km, and the depth of occurrence of the crystalline basement varies from 3.0-3.5 in the southwest to 5.0-7.0 km in the northeast.

Prospecting and exploratory drilling on the subprovince's land has been performed in small amounts. Drilling density at the start of 1978 was about 0.18 m/km^2.

The western side of the Baykal area-Lena trough is of greatest interest in relation to oil and gas, especially in its northeastern part (the Nyuya-Dzherba and Berezov megatroughs).

Moreover, the Turukhan-Noril'sk oil and gas bearing district, which is confined to the Sayany zone of linear dislocations, which includes the Khantayka-Rybninsk and Baklanikha megaswells, the Kulyumbin-Gorbiachin bench and the Angara fold zone, has been singled out for the first time within the Lena-Tungusska oil and gas bearing province.

Industrial influxes of oil and gas from carbonaceous Platonovskaya and Kostinskaya suite sediments were obtained here in three areas: the Sukhotungusska (a flow of oil of up to 32 m^3 per day) and the Nizhneletninskaya and Volodinskaya (flows of gas of 13,000-22,000 m^3 per day).

The Khatanga-Vilyuy gas and oil bearing province is confined to the system of Upper Paleozoic and Mesozoic depressions on the north and east of the Siberian platform--the Yenisey-Khatanga, Lena-Anabar and Verkhoyansk troughs and the Vilyuy syneclise. Three gas and oil bearing subprovinces have been singled out here.

The Lena-Vilyuy gas and oil bearing subprovince embraces the Lena-Vilyuy (not counting the Verkhoyansk region foredeep), the Zapadnyy Vilyuy oil and gas bearing districts, and insignificant contiguous parts of the Anabar and Severnyy Aldan oil and gas bearing districts. In tectonic plan it corresponds to the Vilyuy syneclise, which divides the Anabar and Aldan anteclises and is bay-shaped, and it was discovered along the bottom of Mesozoic sediments on the side of the Verkhoyansk region foredeep; the amplitude of the sagging is up to 6.0 km. Depth of occurrence of the crystalline basement is 12.0 km. The main larger structural shapes that complicate the syneclise are the Khapchagay megaswell, the Suntar vault, and the Linde, Kempendyay and Ygyatta troughs.

Only the upper part of the sedimentary cover (terrigenous sediments of the Mesozoic and Upper Permian), up to 4.0-4.5 km thick, has been studied up till now during deep drilling of the subprovince.

Seven small gas and gas-condensate deposits have been discovered in the subprovince. Drilling density is 1.7 m/km^2.

The most promising and the primary directions for further gas and oil prospecting are the side portions of the Vilyuy syneclise in lensing-out areas of the pre-Jurassic sediments, especially the northwestern sides. In the western part of the syneclise, the slopes of the Suntar vault and side portions of the Ygyatta and Kempendyay depressions adjacent thereto deserve attention.

Two oil and gas bearing districts have been singled out in the subprovince: the Vilyuy and Zapadnyy Vilyuy districts.

The Verkhoyansk gas and oil bearing subprovince has been singled out for the first time. It occupies the eastern portion, adjacent to the Verkhoyan' portion of the Lena-Vilyuy province, and it corresponds in tectonic plan to the Verkhoyansk region foredeep, which stretches along the eastern border of the Siberian platform for more than 1,200 km at a width of up to 100 km. The depth of occurrence of the crystalline basement is 10-12 km. The largest tectonic elements that complicate the depression are the Mengkera and Lunkha-Kele troughs and the Kitcha shelf.

The small Ust'-Vilyuy gas field was discovered in the Kitcha gas-bearing area of the subprovince. Drilling density is 0.46 m/km^2.

The main promise for prospecting for oil and gas should be associated with the western side of the depression, which faces a side of the Anabar anteclise.

The Yenisey-Anabar gas and oil bearing subprovince embraces the Yenisey-Khatanga and Lena-Anabar oil and gas bearing districts, and tectonically it is confined to the Yenisey-Khatanga and Lena-Anabar regional troughs. The Yenisey-Khatanga regional depression stretches out in a latitudinal direction for more than 1,000 km at a width of up to 300 km. The depth of occurrence of the crystalline basement is more than 12 km. The main large structural elements are the Rassokha and Balakhna megaswells, the Tanama vault, the Yangoda-Gorbitskiy ledge and Central Taymyr and Boganida-Zhdanikha megatroughs. The Lena-Anabar regional trough is 250x800 km in area. The depth of occurrence of the crystalline basement is up to 6 km. A number of positive and negative structures (arches, dome-shaped uplifts, depressions and others) have been singled out in the sedimentary cover.

Eight gas and gas-condensate deposits have been discovered in the subprovince. Drilling density is 0.9 m/km^2. The subprovince's territory is marked by unevenness in prospecting and exploratory drilling. The maximum amount of drilling has been going on in the western part of the Yenisey-Khatanga regional trough.

The primary targets of regional prospecting and exploratory work in the subprovince are the Rassokha and Balakhna megaswells, as well as the side portions of the regional troughs.

The Yenisey-Khatanga and Lena-Anabar oil and gas bearing districts have been singled out in the subprovince.

Thus, as a result of the generalization and correlation of geological and geophysical data of recent years, the spatial position of the Tera-Nizhnyaya Tungusska and Baykal region-Lena regional troughs in the edge portions of the Siberian platform and the zone of its articulation with the Sayany-Yenisey and Baykal-Patom folded districts has been concretized. The contours of the Angara-Botuoba anteclise have been refined. It includes the

Nepa-Botuoba anteclise and the Angara-Lena fault bench. The contours of the summits of the Angaro-Botuoba anteclise and of the single Nepa-Peleduy vault have been noted. The contours of the Baykit anteclise have been refined with the bounding of its northern submergence by the Bakhta semivault. At the northwestern platform, the Kureyka-Kheta anteclise, which includes the Suringdakon, Tutonchany, Anam and Ledyan vault uplifts have been singled out for the first time. The spatial position of the Lower Paleozoic of the Tungusska syneclise, which occupies an enormous space between the Anabar, Angaro-Tobuoba, Baykit and Kureyka-Kheta anteclises, has been refined.

In accordance with existing views and in light of development of the principles of oil and gas geology regionalization of the Siberian platform, the Nizhnyaya Tungusska, Baykit-Nepa, Anabar, Severnyy Aldan, Sayany-Yenisey, Tera-Nizhnyaya Tungusska and Baykal region-Lena oil and gas bearing subprovinces, as well as the independent Turukhan-Noril'sk oil and gas bearing district, have been singled out within the Lena-Tungusska oil and gas gas bearing province. Within the Khatanga-Vilyuy gas and oil bearing province, the Lena-Vilyuy, Verkhoyansk and Yenisey-Anabar gas and oil bearing subprovinces have been singled out.

Study of the Siberian platform has been very poor and uneven. Drilling density at the start of 1978 was about 0.65 m/km^2, which is about 1/17th the average density of deep drilling for the Soviet Union as a whole. The Vilyuy, Nepa-Botuoba, Angara-Lena and the western regions of the Yenisey-Khatanga oil and gas bearing districts have been studied the most. In other regions of the platform, single holes have been drilled and the drilling density does not exceed 0.003-0.46 m/km^2. In the central and northern regions of the Tungusska syneclise and the Kureyka-Kheta anteclise, which are promising for prospecting for oil and gas, not a single deep hole has been drilled. The slopes of large positive uplifts (anteclises, vaults and megaswells) and side portions of negative structures (syneclises, depressions and megatroughs), which are most promising for prospecting for new oil and gas bearing zones, have practically not been studied. It is these territories that are the primary targets of regional geological and geophysical work and of prospecting and exploratory drilling.

BIBLIOGRAPHY

1. Bakirov, A. A. "Geologicheskiye osnovy prognozirovaniya neftegazonosnosti nedr" [Geological Bases for Predicting the Presence of Oil and Gas Deposits]. Moscow, Nedra, 1973.

2. Bakirov, A. A. "O zakonomernostyakh obrazovaniye i nauchnykh kriteriyakh poiskov i razvedki krupnykh i krupneyshikh mestoskopleniy nefty i gaza" [The Laws of Formation and the Scientific Criteria for Prospecting for and Exploring Large and Very Large Deposits of Oil and Gas]. Moscow, VNIIOENG [All-Union Scientific-Research Institute for the Organization, Management and Economics of the Oil and Gas Industry], 1978.

3. Bakin, V. Ye. and Ovcharenko, A. V. "Peleduyskiy svod--naiboleye perspektivnyy rayon Nepsko-Botuobinskoy neftegazonosnoy oblasti. Refer. sb. Seriya 'Geologiya i razvedka gazovykh i gazokondensatnykh mestorozhdeniyi'" [The Peleduy Arch--the Most Promising Region of the Nepa-Botuoba Oil and Gas Bearing District. Collection of Abstracts. The "Geology of and Exploration for Gas and Gas-Condensate Deposits" series], No 3, Moscow VNIIEGazprom [All-Union Scientific-Research Institute for the Economics and Organization of Production and Technical and Economic Research in the Gas Industry], 1978.

4. Grebenyuk, V. V., Kontorovich, A. E., Mel'nikov, N. V. et al. "Osnovnyye napravleniya geologorazvedochnykh rabot na neft' i gaz na territorii Krasnoyarskogo kraya v zavershayushchiye gody desyatoy pyatiletki" [The Main Directions for Geological Exploration for Oil and Gas in the Krasnoyarskiy Kray Area During the Concluding Year of the Tenth Five-Year Plan]. GEOLOGIYA NEFTI I GAZA [Oil and Gas Geology], No 12, Moscow, Nedra, 1978.

5. Dikenshteyn, G. Kh., Aliyev, I. M. et al. "Neftegazonosnyye provintsii SSSR" [Oil and Gas Bearing Provinces of the USSR]. Moscow, Nedra, 1977.

6. Zabaluyev, V. V. et al. "Oil Geology Regionalization of Western Yakutia," in the book, "Geologicheskoye stroyeniye i voprosy neftegazonosnosti Yakutskoy ASSR" [The Geological Structure and Questions of the Presence of Oil and Gas in the Yakutsk ASSR]. VNIGRI [All-Union Petroleum Scientific-Research Geological Exploration Institute] Transactions, No 385, Leningrad, 1976.

7. Kontorovich, A. E., Mel'nikov, N. V. and Starosel'tsev, V. S. "Neftegazonosnyye provintsii i oblasti Sibirskoy platformy" [Oil and Gas Bearing Provinces and Districts of the Siberian Platform]. SNIIGGIMS [Siberian Scientific-Research Institute for Geology, Geophysics and Mineral Raw Materials], No 222, Novosibirsk, 1975.

8. "Printsipy neftegeologicheskogo rayonirovaniya v svyazi s prognozirovaniyem neftegazonosnosti nedr. Trudy Vsesoyuznogo soveshchaniya" [Principles of Oil and Gas Geology Regionalization in Relation to Forecasting the Presence of Oil and Gas. Transactions of an All-Union Conference]. Moscow, Nedra, 1976.

COPYRIGHT: Vsesoyuznyy nauchno-issledovatel'skiy institut organizatsii, upravleniya i ekonomiki neftegazovoy promyshlennosti (VNIIOENG), 1979

11409
CSO: 1822

UDC 550.834:553.98.061.4M(571.1)

WIDE BAND ACOUSTIC WELL LOGGING TESTED AT SAMOTLOR

Moscow NEFTEGAZOVAYA GEOLOGIYA I GEOFIZIKA in Russian No 11, Nov 79 pp 30-33

[Article by B. M. Bikbulatov, O. L. Kuznetsov, Yu. A. Kur'yanov and A. K. Mavlyutov of VNIIYaGG [All-Union Scientific-Research Institute for Nuclear Geophysics and Geochemistry] and Tyumen'neftegeofizika [Tyumen' Trust for Petroleum Geophysics]: "A Test in Wide Band Acoustic Well Logging at the Samotlor Field"]

[Text] The use of wide-band acoustic logging (AK) during the study of well profiles with a view to singling out productive reservoirs, water-encroachment zones, VNK's [oil-water contacts] and GVK's [gas-water contacts] has been based upon physical premises, from which primarily the following must be singled out [3]:

high sensitivity of the dynamic parameters of longitudinal and transverse waves to rock saturated with water, gas and oil, especially to emulsion combinations of pore-filler fluids (40-400 percent, relative); and

the relatively weak influence of the nature of reservoir saturation on the kinematic parameters of the longitudinal and transverse waves (0-10 percent, relative), enabling the kinematic characteristics to be used in evaluating porosity of the beds.

At the Samotlor oil and gas field, determination of the nature of bed saturation of cased wells by the existing set of nuclear-geophysics methods is a complicated task because of insignificant mineralization of the reservoir waters and the injection of fresh water. Work done at West Siberian fields with high-frequency apparatus [2] has indicated the possibility in principle of classifying reservoirs by nature of saturation by the use of dynamic AK parameters. The ANK-1m apparatus for wide-band acoustic well-logging was developed and produced in 1976 in order to further improve the acoustic-monitoring method and the making of measurements by wide-band AK at Tyumenskaya Oblast fields by Tyumen'neftegeofizika under the supervision of VNIIYaGG, based upon the AKN-1 and SPAK-2m instruments. During 1976-1978 experimental field testing of wide-band AK for the resolution of oil and gas field tasks was conducted at the

Samotlor field by Tyumen'neftegeofizika. The measurements made with the AKN-1m apparatus were performed, as a rule, in wells with casing strings. Experience in work with the AKN-1m apparatus at these same fields showed that in order to obtain authentic information about the physical characteristics of the rocks, which was registered in analog form, it was necessary that the A_{tsk}* parameter of acoustic cementometry not exceed 10-15 standard units. Therefore, for an interpretation of the wide-band AK parameters that were registered in analog form, intervals that corresponded to these conditions were chosen.

Figure 1 shows the results of wide-band AK research for 14 Samotlor field wells. A standardized parameter of the amplitude of the longitudinal leading wave A_{otn} is used as the basic parameter of the acoustic field. Standardization was based on the amplitude that was registered in a homogeneous water-bearing bed. A comparison of the dynamic (A_{otn}) and kinematic (Δt) characteristics for group AV beds of the Samotlor field (see figure 1a) indicates high authenticity in determining the nature of bed saturation in accordance with wide-band AK. Beds with different saturation characteristics had the following parameters:

gas saturation: $A_{otn} \leqslant 0.15$ and $\Delta t \geqslant 360$ microseconds;

oil saturation: $0.15 \leqslant A_{otn} \leqslant 0.6$ and 320 microseconds $\leqslant t \leqslant$ 370 microseconds; and

water saturation: $0.6 \leqslant A_{otn} \leqslant 0.1$ and 300 microseconds $\leqslant \Delta t \leqslant$ 340 microseconds.

Consequently, with acquisition of the A_{otn} parameter, it was possible to determine unambiguously the nature of saturation of group AV_{1-5} beds of the Samotlor field. This conclusion is also confirmed

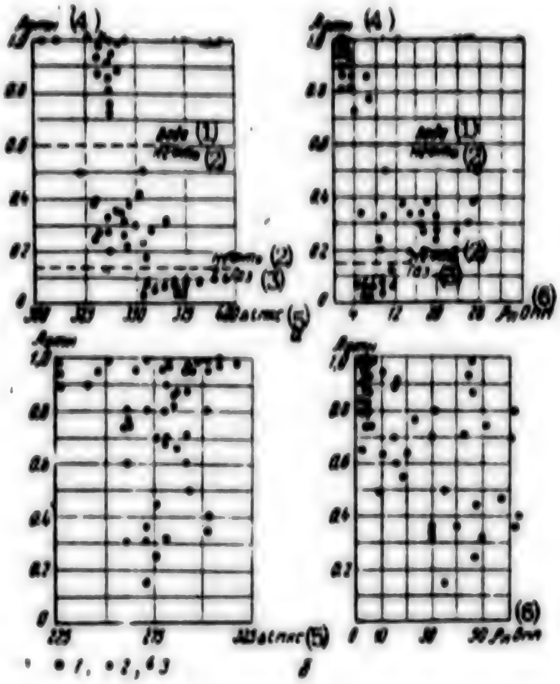


Figure 1. A comparison of A_{otn} Parameters with Δt and A_{otn} with $\rho_п$ (the Samotlor field).

a.	For AV beds	3.	Gas.
б.	For BV beds.	4.	A_{otn}.
1.	Water	5.	Δt microseconds.
2.	Oil	6.	$\rho_п$ ohms.

---

*Since the AKTs apparatus is not standard and there is no reliable means for calibrating it, absolute values for A_{tsk} are given with a certain approximation.

by the results of comparing the values of the A_{otn} parameter with the values of the bed resistance $\rho_{п}$ (see figures 1a and 1б).

It is known [4] that electrical methods, which are the most sensitive to change in type of saturation fluid, have the leading role in classifying reservoirs as oil-saturated or water-saturated. However, by the time wide-band AK research was conducted at the Samotlor field, bed resistance could have changed because of water enroachment and natural output. Therefore, it was more desirable to compare the bed's acoustic parameters Δt and A_{otn} that were registered simultaneously.

An analysis of the data of wide-band AK for group BV beds of the Samotlor field was conducted in similar fashion. The results, which are shown in figure 1б, indicate that the water-saturated and oil-saturated parts of the beds of this group do not differ in the dynamic parameter A_{otn}. Sometimes different A_{otn} values correspond to the intervals of one and the same oil-saturated bed which possesses homogeneous reservoir properties. Sometimes a high level of the A_{otn} value is observed that corresponds to a water-saturated bed instead of an oil-saturated bed. The analysis of the data of acoustic cementometry and of the acoustic wave field that is registered by the acoustic film recorder (AKP) excludes the effect of the quality of cementation. The influence of the conditions for measuring (instrument centering, logging speed and others) apparently also is excluded, otherwise it would appear also for the AV beds.

Therefore, it was desirable to examine the causes of the disagreements that are noted for the AV and BV beds. As is known [3], the characteristics of the longitudinal leading waves that are propagated in the rocks are determined mainly by porosity and the compressibility factor of the phases. The summary absorption coefficient for water-, oil- and gas-saturated reservoirs is determined by the coefficients of thermal absorption ($\alpha_{\text{терм}}$) and ($\alpha_{\text{вя}}$):

$$\alpha = \alpha_{\text{терм}} + \alpha_{\text{вя}}.$$

For water, the temperature effects are of little significance, that is, the attenuation is determined mainly by viscosity-inertial properties. For oil the temperature absorption coefficient is of considerable importance. The main petrophysical properties of the Samotlor field's productive beds are cited in the table.

Bed	Porosity, %	Permeability, Darcys	Residual water, %	Dynamic viscosity of the oil in place cp	Gas factor, m^3/m^3
AV_1	23	0.116	35.9	1.6	--
AV_{2-3}	27	0.115	30.5	1.71	160
AV_{2-5}	27.2	0.500	26.1	1.97	160
BV_8	23.6	0.320	26.3	0.88	70-100
BV_{10}	23.7	0.100	38.7	0.9	100

Note: The dynamic viscosity of the water in place is 0.6 cp.

It is evident from the table that the dynamic viscosity of the oil of beds A_{1-5} is more than twice that of the water in place; the dynamic viscosity of the oil of beds BV_{8-10} differs insignificantly from that of the reservoir water. The gas factor of beds AV_{1-5} is almost twice that of beds BV_{8-10}. An analysis of reservoir properties, and also of the lithological and granulometric composition [1] of beds AV and BV, testify that the differences between them are insignificant.

Thus, the differences of beds AV_{1-5}, which are different in nature of saturation, are associated, according to the dynamic parameter A_{otn}, with a considerable difference in the dynamic viscosity of the saturating fluid and also with an increase in the gas factor in the productive reservoirs.

Singling Out the Water-Encroachment Zone by Wide-Band AK. The high sensitivity of the dynamic parameters of longitudinal waves to the saturation of rocks with oil and gas permits zones of water encroachment of beds to be singled out in certain cases. Let us examine the possibility for identifying water-encroached intervals by wide-band AK in the example of the AV beds in well 10353 of the Samotlor field (figure 2). In order to determine the intervals of water encroachment of the AV_{2-3} bed in this well, supplementary research was conducted with dielectric wave logging apparatus (VDK) after completion of drilling and by AK wide-band apparatus later on, 4 months after casing of the well. The results of processing of the data of the standard complex VDK and wide-band AK are shown below.

Bed AV_1 (1858.2-1882.8 meters). According to the standard complex, it was noted as productive. Because of clayeyness, the values of dielectric permeability (ϵ) were overstated--by 14-22 standard units. According to wide-band AK, the bed is characterized as gas saturated ($A_{otn} \leqslant 0.09$).

Bed AV_{2-3} (1885.8-1927.8 meters). The standard complex singled out the intervals 1885.8-1898.2 and 1913.0-1927.8 meters as oil saturated. The nature of saturation of the 1898.8-1904.0 interval was not clear. The

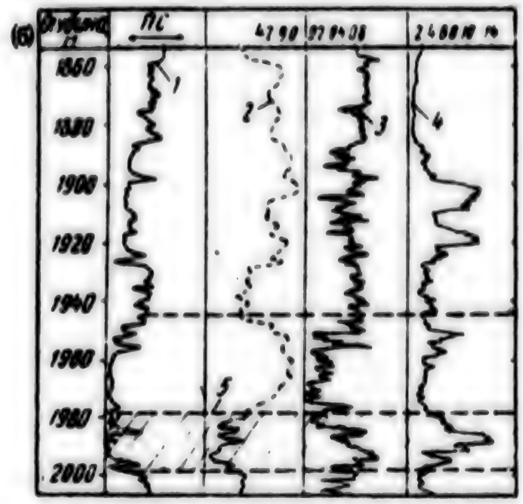


Figure 2. An Example of Singling Out Water-Encroached Intervals in Well 10353 of the Samotlor Field.

1. PS [well potential].
2. MK [bridge-logging method] Ohms.
3 VDK [dielectric-wave logging] (sin $\frac{\Delta G}{2}$).
4. A_1 (relative unit).
5. Interval of water encroachment.
6. Depth.

1904.0-1910.4 interval was water encroached. VDK supplements the standard complex: the 1898.8-1904.0 interval is flushed by water. According to the research results, when drilling was completed the bed was in the water-encroachment stage. This is confirmed also by wide-band AK studies, according to which the roof of the beds (1890.0-1897.0 meters) is oil saturated (A_{otn} 0.2); at the 1911.0-1916.8 and 1923.0-1927.8 meter intervals there is oil with water ($A_{otn} = 0.55-0.65$); and the remainder of the bed is completely water encroached ($A_{otn} \geqslant 0.85$).

Bed AV_{4-5} (1947.8-1999.0 meters). According to the standard complex the 1947.8-1948.8, 1950.2-1954.2 and 1956.4-1974.0 meter intervals were evaluated as oil saturated. The 1974.0-1976.0 meter interval was included in the transition zone. The bottom part of the bed was saturated with water. The results of the wide-band AK studies did not contradict the data of the standard complex.

Conclusions

1. On the basis of experimental field testing of wide-band AK under the Samotlor field situation, the boundary values of A_{otn} parameters for determining the nature of saturation of beds of the AV member were defined.

2. For the beds AV_{1-5} of the Samotlor field, the possibility of singling out water-encroached intervals by means of wide-band AK in cased wells was indicated.

3. At the given stage of research, the classification of beds of the BV member, which has a different nature of saturation, is impossible on the basis of use of the A_{otn} parameter alone.

The solution of this task requires the conduct of repeat regimes of acoustic measurements as well as of measurements during reservoir stimulation.

BIBLIOGRAPHY

1. Aristov, V. N., Bezhayev, M. M. and Romanov, Ye. A. "The Effect of the Lithological Composition on the Reservoir Properties of Rocks of the Samotlor Oilfield." In the collection, "Geologiya i razrabotka neftyanykh mestorozhdeniy Zapadnoy Sibiri. Trudy Giprotyumenneftegaza" [The Geology and Development of Oil Deposits of West Siberia. State Institute for the Design of Petroleum and Gas Industry Facilities in Tyumenskaya Oblast]. No 31, Tyumen', 1972.

2. Yemelev, V. D. and Lebedeva, T. I. "Determination of the Nature of Saturation of Reservoirs by the Acoustic Method in Cased Wells under West Siberian Conditions." NEFT' I GAZ TYUMENI [Oil and Gas of Tyumen'], No 25, 1976.

3. Ivakin, B. N., Karus, Ye. V. and Kuznetsov, O. L. "Akusticheskiy metod issledovaniya skvazhin [The Acoustic Method for Studying Wells]. Moscow, Nedra, 1978.

4. Leont'yev, Ye. I. et al. "Izucheniye kollektorov nefti i gaza mestorozhdeniy Zapadnoy Sibiri geofizicheskimi metodami" [The Study of the Reservoirs of Oil and Gas Fields of West Siberia by Geophysical Methods]. Moscow, Nedra, 1974.

COPYRIGHT: Vsesoyuznyy nauchno-issledovatel'skiy institut organizatsii, upravleniya i ekonomiki neftegazovoy promyshlennosti (VNIIOENG), 1979

11409
CSO: 1822

NEW STEAM GENERATOR READY FOR USE IN KOMI ASSR

Moscow TRUD in Russian 30 Jan 80 p 1

[Article by K. Mosiyenko (Taganrog): "Key to Petroleum Resources"]

[Text] The "Krasnyy Kotel'shchik" Production Association manufactured the first unit of a special design of a steam generating installation with a productivity of 60 tons of steam per hour. It is intended for the most efficient extraction of petroleum from the strata. The steam generator will operate in the petroleum fields of the Komi ASSR where the production of this most valuable raw material is made difficult by the fact that the petroleum here is viscous.

The installation operates in the following manner: hot steam under high pressure, of 160 atmospheres, is pumped over pipes into the well. The petroleum is liquified as a result and it becomes possible to extract it fully from the ground. This is very important if it is considered that the petroleum production experience in the USSR and abroad indicates that even under favorable conditions, over half of its resources remain unextracted, therefore, that it is very important for the country's economy, not to spend money on drilling new wells, but to extract from already operating or closed wells two to two-and-a half times more of this valuable product.

The Taganrog boiler builders had to solve complex engineering problems in manufacturing the automatic steam heating installation unit. ·Such installations for a similar purpose, but operating on a different principle, exist in the United States and Japan. They are low-power and are not suitable for operation under rugged climatic conditions. It was new to the enterprise not only in its purpose, but also by the technology of its production, size and the materials used in its manufacture.

The units will be delivered to the petroleum fields over impassable roads by all types of transport. Therefore, aluminum and light hardware are being used widely in its design. The "Krasnyy Kotel'shchik" collective had to work with "strange" materials and weld aluminum.

Designers, guided by Yu. Zakharchenko, developed the technical and working project of the installation. The functions of the units (there are 11 of them) had to be divided in a way to provide for maximum convenience in transporting the installation and in its operation. The designers coped with this successfully. Much energy and ingenuity were demonstrated by engineers V. Latyshev, A. Chernykh, etc. Specialists under the guidance of I. Kaninev, deputy chief technologist of the association, insured the observation of an unaccustomed installation technology to the "Krasnyy Kotel'shchik". The complicated configuration of the pipe system demanded an improvement in an entire number of production processes. Here I. Slyusarev's welding brigade was of especially great help. Innovators A. Serikov and P. Kovalev, together with the brigade leader, developed tables of special design and the most cumbersome operation -- welding aluminum panels -- was done one-and-a-half times faster.

"We are proud that the manufacture of the first installation in the country for higher extraction of petroleum from the strata was entrusted to us," stated A. Karpenko, senior foreman. "This, it may be said, is an experimental installation. But we are responsible for our experimental installation becoming the start of a series. By the way, it is planned that these installations in the coming five-year plan period be built in Volgodonsk at the "Energomash" Plant of our association."

This year units of the installation assembled at the installation area will make up an almost 500-ton "star," which will cover an area of 800 square meters. The unit will be heated by aluminum panels. Even at minus 40 degrees, the temperature in the steam generator building will be plus 20 degrees. Only two operators can control the complex automatic system.

2291
CSO: 1822

FUELS

UDC 622.454:622.33.012(477.61/.62)

VENTILATION OF DONBASS MINES

Moscow UGOL' in Russian No 11, Nov 79 pp 23-24

[Article by Candidate, Technical Sciences, K.K. Busygin (MakNII): "The Status of Ventilation in Donbass Mines"]

[Text] The increase in working depths in the Donetsk Basin is accompanied by an increase in the level of gas in the mines. Approximately 80 percent of the mines are considered dangerous due to gas, and 67.8 percent of the mines are category III, above-category, and dangerous relative to outbursts. The average methane-presence of the mines is 18.7 m^3/t. The absolute methane-presence of the cutting sectors during the past 13 years has increased by a factor of 2.1 and now has an average value of 3.5 m^3/min, reaching in some mines 150 m^3/min and greater. With depth, the gas bearing of surrounding rock increases, and up to 75-85 percent of the gas liberated in the excavation sectors enters the air shafts.

Coal seams of the middle stage of metamorphism, in addition to methane, contain higher hydrocarbons, primarily ethane. In certain mines, instances were recorded of the release of liquid hydrocarbons in the form of dripping, of thinstream emission and leakage of condensates, bitumens or oil-like liquids. As shown by studies, the relative content of higher hydrocarbons in liberated fuel gases does not exceed 10 percent, and at depths attained does not practically affect the explosive properties of the methane-air mixture.

Approximately 80 percent of the methane liberated in the mines is removed through ventilation. On an average throughout the basin, 3.9 m^3/min of air is fed per 1 ton of daily production. Conversion to the face method of calculating air quantity, implemented during the Sixties, facilitated improvement of ventilation planning quality during the construction of new and renovation of existing mines. However, existing norms for planning do not provide for a coefficient of air reserve for possible errors in prediction of gas presence and require a review.

In conjunction with the concentration of mining operations, increased air volume fed, and the complexity of supporting mining operations at great depths, fan depression frequently exceeds rated values. In 1978, 9 % of fans had a depression of up to 100 kgs/m^2, 30 % 100—200, 28 % 200—300, 29 % 300—450, and 4 % 450—750. For mine ventilation, in addition to fans of a new type (VTs, VTsD, VRTsD, VTsP, VOD), the proportion of which has increased during the past 4 years by a factor of 1.8, obsolete design fans are being employed, fans in need of modernization or replacement.

Basin mines operate approximately 42,000 ventilation structures, including 20,000 ventilation doors. The quality of the ventilation structures is not always sufficiently high, which results in a significant leakage of air and impedes the feed of necessary air volumes to the operational areas. It is therefore very important to reduce air leakage from ventilation structures to established norms, to develop standard designs for ventilation structures and to conclude work begun during the current five-year plan to build automated sluicing devices.

Currently, high-gas content mines are virtually completely equipped with automatic gas protection apparatus (AMG-3). However, this apparatus, as a rule, monitors the average concentration of methane in the ventilation flows, an increase of which occurs slowly in the event of an interruption of ventilation, more slowly than the formation local accumulations of gas. As a result, in high gas-content mines, it is advantageous to establish an additional remote control or monitor of air volume entering the cutting areas. For this purpose, the ISV-1 air flow speed indicator and the "Air" set have been developed. Regarding the equipping of mines with computer complexes, it is advantageous to install the "Atmos" dispatch control subsystem for mine ventilation, the experimental use of which has yielded positive results. The task of future scientific research should be to consider the development of aerodynamic bases for the operational control of mine ventilation for warning of dangerous gas conditions and to build automatic ventilation control facilities.

In order to obtain reliable initial data, it is necessary during the development of programs to improve ventilation and rennovation of of mine ventilation, gas surveys must be conducted along with depression surveys. During the current five-year period, experimental prototype instrument sets have been built for gas surveying, including the portable mine recording instrument for simultaneously recording of two parameters and a portable methane concentration indicator and air flow speed indicator with independent power supply. Organizing the series production of these instruments will facilitate wider utilization of gas surveys.

Approximately 40 % of air supplied to the mine on the average is for the ventilation of the cutting area. Primary cutting area ventilation schemes (60 %) are return type with joining of ventilation flows to the air shaft or coal block. The deficiency of these layouts under high gas-content conditions is the possibility of localized methane accumulations near debris under the ventilation galleries or in dead end areas left during the damping of ventilation drifts. It is necessary to select cutting area ventilation schemes with an allowance for preventing the formation of local gas accumulations in active cutting areas and to preclude the formation of explosive concentrations of methane in the 10-meter zone of the air shaft, immediately abutting the face area. Instructions on this problem are included in the draft appended to "Guidance In Designing Coal Mine Ventilation".

Extremely effective under high-gas content of sectors are the ventilation schemes with separate rarification of methane for liberation sources, however, the proportion of such schemes constitutes only 9 %. With ventilation schemes having air drift/gallery damping in addition to degasification, in certain cases an insulated exhausting of the methane-air mixture from the air gallery outside the sectors through pipes-conduits (large diameter), or via unsupported airways is employed. This method eliminates the formation of dangerous accumulations of methane in the connecting longwalls at air galleries, and to increase the permissible load in gas factor at the face by a factor of 1.5—2. Currently, a special gas exhausting fan is under development. Also necessary is the development of an apparatus for automatic monitoring of methane concentrations in gas exhaust conduits and replacement of metal pipes now used with synthetic material pipes.

One of the reasons delaying the increasing of loads at the breakage face is the formation of local methane concentrations, particularly in working of steep beds and uptake ventilation. The primary measures for prevention of methane ignition near combines under sloping and inclined bed conditions is increased speed of air movement, irrigation of the cutting instrument, and automatic monitoring of methane concentration, and under steep bed conditions--the use of downtake ventilation of breakage areas, which simultaneously increases the stability of ventilation, and the use of hydropneumatic ejectors. To successfully combat local accumulations of methane, devices designed for this purpose must be developed in phase with the construction and designing of cutting machinery.

In recent years ventilation conditions have become considerably more complex in conducting preparatory operations. Compared to 1970, the gas-content of blind (dead end) preparation operations increased by a factor of 1.4, the average area of a cross-section by a factor of 1.5, and the average length of a dead end segment increased by a factor of approximately 2 and equals presently 450 meters. Approximately 30 % of the shafts have a dead end segment more than 500 meters in length, and 10 % have segments of more than 1000 meters. These factors, and also an increase of temperature in rocks with increased depth with increased minimal permissible air flow movement speed from 0.15 to 0.20 m/s resulted in an increased (by a factor of 2.6) volume of air required for ventilation of the shafts. The average volume for a single face is 130 m^3/min. During shaft operations using the drill-blast method for gas-bearing coal beds, the air requirement increases to 400—600 m^3/min.

The primary ventilation method for preparatory (developmental) workings is the pressure method. Flexible ventilation pipes 0.3—1 meter in diameter are used for air feed. The most widely used are 0.6 meter diameter pipes

(73 %), and the 0.8 and 1 meter diameter pipes constitute 5 % of the total. The local ventilation fans produced with single operation cannot always provide a supply of the necessary volume of air; therefore in 30 % of the shaft workings 2 and more fans are employed in each, which are installed successively (by stage). In recent years, fans have been built for the ventilation of long preparatory shafts: the VTs-7 with an output of 1.4—11 m^3/s with a pressure of 100—1080 kgs/m^2 and the VTs-9 with an output of 5—29 m^3/s with a pressure of 300-1000 kgs/m^2. These fans are capable of providing the necessary ventilation modes for the ventilation of developmental workings with allowances for longterm development of the coal industry over the next 10-15 years.

The AKV-2P monitoring apparatus for monitoring air volume, the automatic gas protection apparatus (AMG-3), or the portable automatic signal device for methane have found universal usage for monitoring the status of ventilation in developmental workings. Approximately 8 % of the mines are equipped with "Veter" local ventilation fans with remote control devices.

To improve the status of ventilation in developmental workings, it is necessary to organize the industrial production of high-pressure local ventilation fans, and to improve the quality of ventilation pipe, specifically increasing the length of elements to 40—60 meters. Perfection and improvement of work currently underway to build facilities for the dust removal pressure-exhaust ventilation and dispatch control of ventilation in developmental workings will facilitate and promote a further improvement of sanitary-hygienic conditions and increased work safety.

COPYRIGHT: Izdatel'stvo "Nedra", "Ugol'", 1979

CSO: 1822
8851

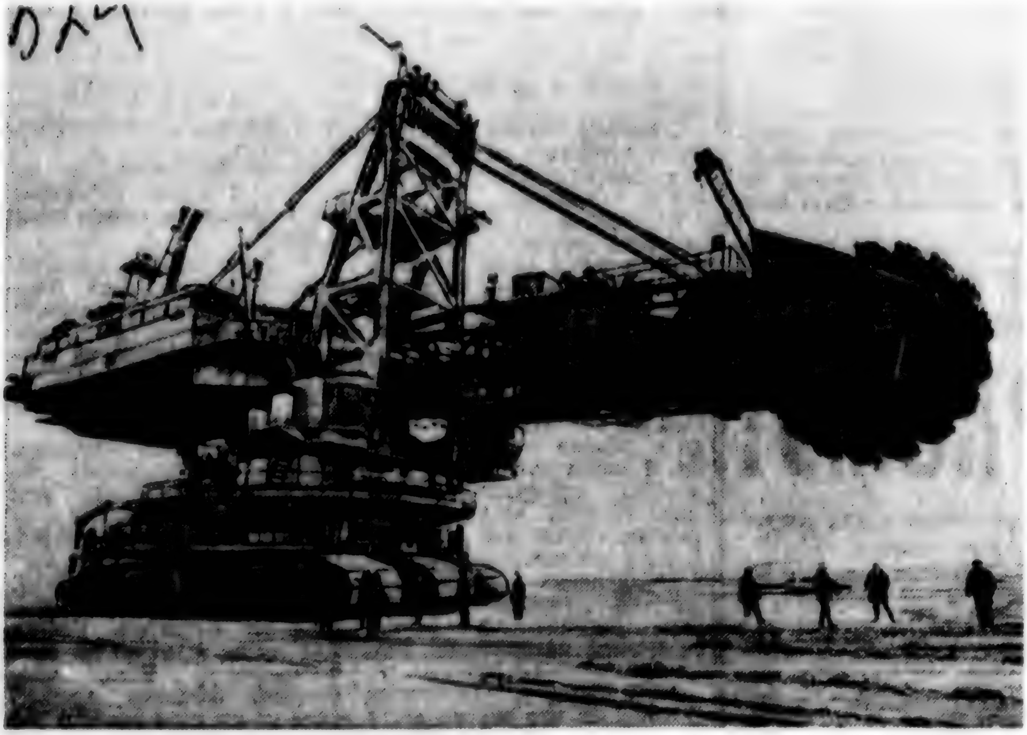
FUELS

NEW ERP-2500 ROTARY EXCAVATOR

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 11 Jan 80 p 2

[TASS photo and caption]

[Text] The New 2500-ton per hour rotary excavator for the "Bogatyr'" strip coal mine of the "Ekibastuzugol' Association was manufactured at the Zhdanovsk Heavy Machine Building Plant and installed on the assembly site at Ekibastuz. The coal mining "ERP-2500" giant is self-propelled on caterpillar tracks and moves 300 meters per hour. With the introduction of the new machine, the "Bogatyr'" strip mine will reach its rated capacity of 50 million tons of coal per year.



ERP-2500 rotary excavator

FUELS

OFFICIAL REPLIES TO LETTER OF CRITICISM

Kiev RABOCHAYA GAZETA in Russian 29 Jan 80 p 2

[Article by P. Marosin, Deputy Minister of Ukrainian SSR Coal Industry]

[Text] In the article "Where Lost, Where Found," published 15 December of last year, the shortcomings in fulfilling plans for mining and delivering coking coal to the Minchermet [Ministry of Ferrous Metallurgy] of the Ukrainian SSR are justly noted.

In 1979, due to the unsatisfactory work of the "Stakhanovugol'," "Makeyevugol'," "Artemugol'," "Krasnodonugol'" and "Krasnoarmeyskugol'" associations, the plan for mining coking coal for the Ukrainian SSR Minugloprom [Ministry of the Coal Industry] was not fulfilled. As a result, enriching factories that reprocess the coal for coking did not cope with their tasks.

The Ukrainian Minugleprom reviewed the causes of the unsatisfactory work of the mines and associations for mining coal and developed measures to insure the fulfillment of the established volumes that specify an increase in tunneling new drifts to replace those that are defective due to mining-geological conditions; introduce high-productivity equipment further and improve its utilization; staff mines with workers and supply them with equipment and materials. This will make it possible to improve coal deliveries to enriching factories, produc the necessary blend and eliminate cases where the brand composition of the charge is violated.

Taking into account the article in the newspaper, the ministry instructed the "Ukrzapadugol" to strengthen their monitoring of the quality of the products being loaded for shipment, including those for coke-chemical plants.

2291
CSO: 1822

BRIEFS

PETROLEUM PIPELINE SYSTEM -- KAZAKH SSR. Another petroleum pipeline system was put in operation in the country on the Buzachi Peninsula at the new petroleum-bearing region in Northern Kazakhstan. The Kalamkas-Karazhanbas, Karazkhanbas-Tauchik and the Tauchik-Shevchenko mains brought petroleum to the filling docks of Shevchenko where a large tanker unloaded the first thousands of tons of the raw material. The entire petroleum complex on the Buzachi Peninsula, including large pumping stations, towns and communications lines, were built way ahead of schedule. The builders, designers and operating people solved an entire number of technical problems related to the high viscosity of the local petroleum. Special equipment for heating insures its continuous movement. The best subdivisions of the "Mangyshlakneftegazstroy," trusts were directed to the construction site. A. Sergeyev's brigade of heavy dump truck drivers and I. Belikov's and B. Tanatarov's builder collectives, especially distinguished themselves in the construction of the petroleum pipeline system and field facilities. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 12 Jan 80 p 2] 2291

FIRE FIGHTING -- Donetsk. V'yuga -- the superpower foam generating installation for fighting underground fires will now guard the miners at work. It was created by the Donetsk "Respirator" Scientific Production Association. The first foam-generating installations of the new type, found to be highly efficient in tests, were sent to mine rescue people of Donbass, Kuzbass and Kazakhstan. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 15 Jan 80 p 2] 2291

LIQUID PARAFFIN PLANT -- Kuybyshev. A large facility for manufacturing liquid paraffins was put in operation ahead of schedule at a local petroleum refining plant. The new facility is designed for an annual output of 120,000 tons of this important raw material. It is used at biochemical enterprises to produce protein-vitamin concentrates for feeding cattle. [Text] [Moscow TRUD in Russian 24 Jan 80 p 1] 2291

NEW PETROLEUM GUSHER -- Volgograd. Petroleum has begun to gush from the first well at the Tengizskaya site in Gur'yevskaya Oblast at a depth of 4090 meters. The well was drilled and tested by A. Blinkov's brigade from the Volgograd Drilling Administration of the "Nizhnevolzhskneft'" Association. The Urals-Embenskiy region -- one of the oldest petroleum-producing regions in our country -- is now undergoing its second childhood. The exploration for petroleum is being carried out at depths of up to 6000 meters. The Kazakh prospectors are being actively helped by the people of Volgograd. Recently, in addition to petroleum, a natural gas deposit was discovered here. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Dec 79 p 2] 2291

SYNTHETIC DIAMONDS -- Kiev. A new superhard material "Slavutich S-3121" created by Kiev scientists will help petroleum and gas explorers to drill wells at previously impenetrable depths. Today, the first lot of new tools, made at the experimental plant of the Superhard Materials Institute of the Ukrainian SSR AN, was sent to the "Kaspmorneftegaz" Association. "Synthetic diamonds greatly facilitate technical progress," stated N. Novikov, director of the institute and corresponding member of the Ukrainian SSR AN. "They increase the productivity of labor considerably in various industries, facilitate the origination of improved technological processes and, in the final result, increase the efficiency of production." "Slavutich differs greatly from its predecessors: it is harder, doubles the speed of drilling and costs half as much to make. A coordinating council was created at the AN of the republic to guide the developments of new superhard materials and their introduction. The artificial diamond has already been assimilated by tens of workers in various trades. It grinds steel and cast iron parts, TV kinescopes, lenses, granite, marble and other rocks with extreme accuracy. The use of the "diamond" products of the institute saves the national economy tens of millions of rubles annually. [Text] [Moscow IZVESTIYA in Russian 6 Jan 80 p 2] 2291.

WATER AGAINST METHANE -- Alma-Ata. The Kazakhstan Academy of Sciences scientists helped increase the safety of working in mines of the Karaganda basin where coal strata contain explosive methane. They developed pulsed water jets to remove gas from the strata. Water jets are directed at the strata under pressure of over 100 atmospheres. The methane is drawn off the strata through very small cracks formed as a result, preparing the strata for working two to three times faster. The dangerous gas which is removed from the coal seams does not contaminate the air of cities and settlements. It is directed to boiler furnaces and is used to heat buildings. This saves a considerably amount of fuel for industry. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 31 Jan 8 p 2] 2291

COAL OVER PIPES -- Design is proceeding on a system for the hydraulic transportation of coal from Kuzbass to Novosibirsk. This unusual transport conveyor includes large capacity grinding installations, pumping stations for pumping the coal slurry and cleaning and drying machines. Hundreds of thousands of tons of coal move over an underground hydraulic transportation system from mine longwalls to electric power plant furnaces. The fuel reaches its destination in a few hours. Over 1100 heavy RR trains will be freed annually to transport other freight. Specialists of Minneftegazstroy [Ministry of Petroleum and Gas Construction], the USSR Minugleprom [Ministry of the Coal Industry], the USSR Minergo [Ministry of Power and Electrification] in cooperation with the machine builders of the Mintyazhmash [Ministry of Heavy Machine Building] and Minkhimmash [Ministry of Chemical Machine Building] are preparing intensively for the first experimental-industrial coal pipeline. The length of the line from the "Inskaya" mine at Belovo in the Kemerovskaya Oblast to the Novosibirsk TETs-5 is 250 kilometers. The transit capacity of the line will be 4.3 million tons of coal per year. The function of the overall designer of the line part of the pipeline with the pumping stations was imposed on the collective of the VNIIPItransport [expansion unknown] Institute. A hydraulic test stand is being built on its test grounds near Moscow. It will be used to check new technical solutions. Also tested here will be pumps and equipment for hydraulic transport systems, designed for a pressure of 120 atmospheres. [Text] [Moscow IZVESTIYA in Russian 6 Feb 80 p 1] 2291

NEW APPOINTMENT -- Comrade Abasov Kurban Abas Kuli ogly was appointed chief of the "Kaspmorneftegazprom" All-Union Industrial Association by order of the USSR Ministry of the Gas Industry. Comrade Suleymanov A. B. was freed from these duties in connection with a transfer to other work. [Text] [Baku VYSHKA in Russian 11 Jan 80 p 4] 2291

CONCENTRATOR PLANT IN OPERATION—Chervonograd, L'vovskaya Oblast—An important reserve in increasing coal production has been activated in the Prikarpat'ye. Today, a central concentrator plant of the "Ukrzapadugol'" production association having an annual capacity of 9.6 million tons of coal was placed into operation here. Introduction of this enterprise will enable miners of the L'vov-Volynsk coal basin to begin extracting fuel from beds which earlier were not worked due to high ash-content. The service period of all 22 active mines here was extended by a factor of 1.5—2. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 17 Jan 80 p 2] 8851

CSO: 1822

END

SELECTIVE LIST OF JPRS SERIAL REPORTS

USSR SERIAL REPORTS (GENERAL)

USSR REPORT: Agriculture
USSR REPORT: Economic Affairs
USSR REPORT: Construction and Equipment
USSR REPORT: Military Affairs
USSR REPORT: Political and Sociological Affairs
USSR REPORT: Energy
USSR REPORT: International Economic Relations
USSR REPORT: Consumer Goods and Domestic Trade
USSR REPORT: Human Resources
USSR REPORT: Transportation
USSR REPORT: Translations from KOMMUNIST*
USSR REPORT: PROBLEMS OF THE FAR EAST*
USSR REPORT: SOCIOLOGICAL STUDIES*
USSR REPORT: USA: ECONOMICS, POLITICS, IDEOLOGY*

USSR SERIAL REPORTS (SCIENTIFIC AND TECHNICAL)

USSR REPORT: Life Sciences: Biomedical and Behavioral Sciences
USSR REPORT: Life Sciences: Effects of Nonionizing Electromagnetic Radiation
USSR REPORT: Life Sciences: Agrotechnology and Food Resources
USSR REPORT: Chemistry
USSR REPORT: Cybernetics, Computers and Automation Technology
USSR REPORT: Electronics and Electrical Engineering
USSR REPORT: Engineering and Equipment
USSR REPORT: Earth Sciences
USSR REPORT: Space
USSR REPORT: Materials Science and Metallurgy
USSR REPORT: Physics and Mathematics
USSR REPORT: SPACE BIOLOGY AND AEROSPACE MEDICINE*

WORLDWIDE SERIAL REPORTS

WORLDWIDE REPORT: Environmental Quality
WORLDWIDE REPORT: Epidemiology
WORLDWIDE REPORT: Law of the Sea
WORLDWIDE REPORT: Nuclear Development and Proliferation
WORLDWIDE REPORT: Telecommunications Policy, Research and Development

*Cover-to-cover

END OF FICHE

DATE FILMED

APRIL-1-80

D.D.